972 0

UNITED STATES TARIFF COMMISSION

COMPETITIVENESS OF U.S. INDUSTRIES

Report to the President on Investigation No. 332-65 Under Section 332 of the Tariff Act of 1930



TC Publication 473
Washington, D.C.
April 1972

UNITED STATES TARIFF COMMISSION

Catherine Bedell, Chairman

Joseph O. Parker, Vice Chairman

Glenn W. Sutton

Will E. Leonard, Jr.

George M. Moore

J. Banks Young

Kenneth R. Mason, Secretary

Address all communications to United States Tariff Commission Washington, D.C. 20436

CONTENTS

Summary
PART I
A study of the influence of prices, wages, productivity, and incomes on U.S. foreign trade performance
Recent trends in U.S. foreign trade
Total imports, exports, and balance of trade
Imports from competitor countries
Categories of imports increasing most rapidly
Import penetration of U.S. market
Factors contributing to rapid growth of U.S. imports
Price competitiveness as indicated by indexes
Output per man-hour, hourly earnings, and unit labor costs
All manufacturing
Basic metals industries
Comparison of wholesale price indexes
Industrial raw materials
Manufactured goods
Electrical machinery
Nonelectrical machinery
Chemicals
Textiles
Comparison of export price indexes
Comparison of export prices and wholesale prices,
all manufactures
Export unit values and export shares
Comparison of export prices and wholesale prices,
selected manufactures
Imports and price competitiveness
Responsiveness of imports to changes in income
List of statistical sources
Appendix
Analyses of factors affecting U.S. imports of manufactures from selected countries
TablesU.S. imports from each of 13 competitor
countries, 1965-69
TablesExports from the United States and 10 competitor
countries, by major SITC category, and market shares,
1960-69

PART II

A study of the determinants of the trade position of United States manufacturing industries

Introduction
Date courses and coverage
Mossures of competitive position
Tenant and export positions of U.S. manufacturing industries
and changes in them
A look at some of the industry values
Determinants of the commodity composition of United States and
, , 1
7 1

7 1 1111 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
7 1
The trade data (product 20A)
Industry growth
Mothed of comparison of industry characteristics
newater of the enjoyintione
-1.411
Scale economies
First trade date
Product differentiation
Concentration ratio
Industry growth
Summary interpretation of the importance of the industry
characteristics
Multinational enterprise and U.S. trade performance
The growth and distribution of foreign direct investment
by U.S. firms, 1960-1970
Earnings on direct investments
The influence of multinational activity on U.S. trade
Foreign vs. domestic investment performance
Association between foreign investment and levels of trade
Results from the 20-industry sample
Foreign investment and changes in trade performance
galag of M C cubeddiaries shroad and their impact on 0.3.
importsimports
Summary
The role of technology and the diffusion of technology in
U.S. trade performance————————————————————————————————————
Trade and technological muscle

	Page
The impact of technology sharing on trade	201
Technology flows and trade: the Japanese case	207
Summary: The impact of technology on trade competitiveness	218
Appendix	220

SUMMARY

The deterioration in the U.S. trade balance that began in the mid-1960's and continues to the present is the worst sustained performance in a century. Our merchandise exports were one-third greater than our merchandise imports in the first half of the 1960's, but only 10 percent greater in the last half, and were actually about one percent less in 1970-71. The causes of this poor showing have been variously described as inflation, escalating labor costs, reduced productivity, the spread of technology abroad, activities of multinational companies, and changes in the structure of the American economy. These causes overlap to some extent. They can be summed up in a loss of American competitiveness compared with other major industrial countries.

There has been much debate on the causes for our waning trade balance. Some observers have contended that domestic inflation has priced us out of the markets abroad and caused the sale of many imported goods to accelerate. Others have given equal weight to changes that have taken place over time in the structure of our economy, pointing to the greater growth of services than of manufacturing since 1960. Some have noted that other countries are beginning to catch up with the United States in industrial application of technology. A few believe that activities of the multinational companies tend to replace some American exports, as well as jobs, and to increase our imports. This paper takes a particularly hard look at the two causes most

frequently mentioned--inflation and changes in the economy--and considers briefly the impact of technology and of the multinational companies on our trade balance.

It is clear that inflation has been a substantial factor in our loss of competitiveness. In the postwar period generally the U.S. suffered less inflation than the industrial countries of Western Europe and Japan, maintained rates of productivity increase that equalled or exceeded those abroad, and kept intact a strong position for its goods in international markets. This favorable picture changed rapidly after 1965. Three major price series tell the story: (1) Wholesale prices of U.S. manufactured goods were stable during 1960-64 but jumped by 12 percent in 1965-69, the steepest climb in this price index for any other industrial country except Canada. (2) The index of prices for U.S. industrial raw materials actually fell by 3 percent during 1960-64, but moved up by 10 percent during 1965-69. Other industrial countries straddled the U.S. experience of 1965-69; some fared worse, some better. (3) The index of prices for exports of U.S. manufactured goods rose only 1 percent in 1960-64, but advanced by 13 percent in 1965-69. No other major industrial countries except the U.K. and Canada had such large increases in their export prices in the last half of the decade. Thus, other countries were more successful than the U.S. in holding down inflation during the last half of the 1960's. Furthermore, the U.S. move from a favorable price position in the first half of the decade to an unfavorable position in the second half made comparison with other countries even worse.

Coupled with U.S. inflation since 1965 has been a fall off in labor productivity. The rate of productivity gain in U.S. manufacturing was only half as large in 1965-69 compared with 1960-64, whereas for most industrial countries productivity gain was greater in the last half than it was in the first half of the decade. Unit labor costs in 1965-69 increased by 16 percent in the U.S., 10 percent in West Germany, 3 percent in France, 2 percent in Japan, and declined by 3 percent in the U.K.

The other substantial factor affecting U.S. competitiveness involves a rather subtle change in those characteristics of U.S. industry that are measures of competitive strength. These characteristics include labor skill, low average product age, product differentiation, and scale economies. U.S. exports tend to be concentrated in industries with these characteristics, especially industries with large diverse product lines and rapid market growth. However, changes in trade performance during the 1960's indicate a weakening influence of most of these indicators of our competitive strength.

The reverse is true of imports. The U.S. market has been penetrated by imported goods that embody skilled labor and a decline in average product age, and that depend on scale economies, industrial concentration and greater product differentiation. Western Europe and Japan have greatly increased the size of their capital plant, the skill of their labor, and the expertise of their marketing, all of which has made it much easier for them to compete in the American market.

Finally, our research (1) indicates, tentatively, that some American industries with heavy overseas investment have contributed most to U.S. exports and have had the least impact on the upsurge of U.S. imports; and (2) indicates that the level of export performance of certain individual American industries is closely associated with expenditures on research and development.

COMPETITIVENESS OF U.S. INDUSTRIES

PART I

A STUDY OF THE INFLUENCE OF PRICES,
WAGES, PRODUCTIVITY, AND INCOMES
ON U.S. FOREIGN TRADE PERFORMANCE

Recent trends in U.S. foreign trade

Total imports, exports, and balance of trade

The decade of the 1960's witnessed a rapid growth in U.S. imports, from \$15.1 billion in 1960 to \$36.0 billion in 1969, an average annual gain of 10.2 percent. By contrast, in the previous decade imports increased from \$9.0 billion in 1950 to \$15.7 billion in 1959, an average annual gain of 6.4 percent. Imports accelerated most rapidly in the 5-year period 1965-69, as shown below:

	Average annual per- centage increase
1950-55	5.3
1955-59	7.9
1960-65	
1965–69	13.9

Total imports continued to increase in 1970 and reached \$40 billion, although the percentage gain from the year before--11 percent-- was below the average annual advance of 1965-69.

Exports also trended upwards in 1960-69, from \$19.7 billion in 1960 to \$37.3 billion in 1969. This was an average annual rate of gain of 7.4 percent, somewhat above the increase of the previous decade, 5.7 percent, but well below the rate of gain in imports. However, exports

Table 1.--United States exports and imports and merchandise balance, 1930-70

(Millions of dollars) : Merchandise : Merchandise Ex-Ex-Imports 2/: trade Year Imports 2/: trade Year: ports 1, ports 1 balance 3/balance 3/ 8,954: 1,043 3,843: 3,061: 782 1950--: 9,997: 1930--: 2,904 2,424: 333 1951--: 13,973: 11,069: 2,091: 1931--: 2,388 1952--: 13,205: 10,817: 1,323: 288 1,611: 1932--: 12,264: 10,984: 1,280 1,450: 225 1953--: 1,675: 1933--: 1954--: 12,857: 10,371: 2,486 478 1,655: 2,133: 1934--: 14,298: 11,566: 2,732 2,048: 1955--: 235 2,283: 1935--: 12,905: 4,438 17,343: 2,422: 2,456: 34 1956--: 1936--: 13,418: 6,098 3,084: 265 1957--: 19,516: 3,349: 1937--: 2,983 13,392: 16,375: 1,134 1958--: 1,960: 3,094: 1938--: 1959--: 16,426: 15,690: 2,318: 859 3,177: 1939--: 19,659: 4,586 15,073: 1,396 1960--: 2,625: 4,021: 1940--: 20,226: 5,465 14,761: 1,802 1961--: 3,345 : 1941--: 5,147: 4,522 16,464: 20,986: 2,745: 8,079: 5,335 1962--: 1942--: 5,260 3,381 : 22,467: 17,207: 8,584 1963--: 1943--: 12,965: 18,749: 25,832: 7,083 3,919: 10,339 1964--: 14,259: 1944--: 5,322 5,659 1965--: 26,751: 21,429: 4,147: 9,806: 1945--: 4,796 29,490: 25,618: 3,872 4,942: 1966--: 9,738: 1946--: 1967--: 26,889: 4,141 31,030: 5,756: 8,676 14,430: 1947--: 837 34.063: <u>33</u>,226 : 7,124: 5,529 1968--: 12,653: 1948--: 36,043: 1,289 1969--: 37,332: 12,051: 6,622 : 5,429 1949--: 39,963: 2**,**699 42,662 : 1970--:

Includes re-exports; excludes military grant aid beginning 1946.

2/ General imports.

Source: Foreign Commerce and Navigation of the United States; Bureau of International Commerce, U.S. Department of Commerce.

^{3/} Exports excluding military grant aid valued f.a.s. port of export less imports valued generally at the market value in the foreign country. The import values thus exclude transportation costs (such as ocean freight and marine insurance) and the U.S. import duty.

in 1970 increased to \$42.7 billion, a 14 percent gain over the previous year, compared with the 11 percent rise for imports. (See Table 1)

The merchandise trade surplus (excess of exports over imports) averaged \$5.4 billion annually during 1960-64, but averaged only \$3.1 billion annually during 1965-69. In 1968, a year in which imports jumped 24 percent but exports increased only 10 percent, the merchandise trade balance dropped to \$0.8 billion, the lowest in 9 years. The balance recovered to \$1.3 billion in 1969 and to \$2.7 billion in 1970. This, however, is still substantially below the levels of the early and mid-1960's.

Imports from competitor countries

7.7

Table 2 shows that U.S. imports from 13 specified countries supplied 61 percent of total U.S. imports in 1965 and 71 percent in 1969. Canada and Japan supplied about two-fifths and one-fifth, respectively, of the imports from these 13 countries.

Imports from all of the listed countries rose substantially during 1965-69. Although imports from South Korea, Taiwan and Hong Kong grew at the highest rates, the value of imports from those countries was still relatively small in 1969 and represented a high concentration of consumer goods. In 1969, Canada, Japan, and West Germany supplied about twice as much as in 1965. Imports from the United Kingdom rose about 50 percent. Other countries that had percentage increases greater than the overall average were Italy and the Netherlands.

Japan, which had accounted for 11 percent of all U.S. imports in 1965, furnished 14 percent in 1969. Canada's contribution increased

from 23 percent to 29 percent during the same period, attributable in large measure to operation of the U.S.-Canadian Automotive Agreement.

U.S. imports of manufactured products comprised 52 percent of total imports in 1965 but 64 percent in 1969. Table 2 shows imports of manufactured products from the specified countries in 1965-69. (Imports of manufactures by principal product groups are shown for these countries in appendix tables 2-14.) The 13 countries accounted for 84 percent of imports of manufactured products in 1965 and 92 percent in 1969. Five countries—Canada, Japan, West Germany, United Kingdom, and Italy—together accounted for over 70 percent of U.S. imports of manufactures in 1969. Imports of manufactures comprised the following percentages of total imports from each of the 13 countries in 1969:

Country Per	rcent	Country	Percent
Japan South Korea West Germany Hong Kong Sweden Belgium	95 95 91 91 89	Switzerland Italy United Kingdom France Canada Netherlands	85 84 78 78 65
Taiwan	- 86		

Table 2.--United States general imports of all merchandise and of manufactured produc by specified sources, 1965-69

	(Value in	millions	of dolla	rs)		
				•		: 1969 as a
Country	1965	: 1966	: 1967	: 1968	: 1969 :	: percentag
	: 	! 		•		of 1965
·		•				
Moto 3	21,429	05 619	26 880	• 22 226	36,043	•
Total			26,889			1
Japan	. ,				•	
United Kingdom						
Belgium		•				
Canada			• .			
France						
Hong Kong						
Italy						
Netherlands						
South Korea						
Sweden	243 :	300			-	
Switzerland	306	388				
Taiwan	, ,,,	117		: 270	388	<u>)</u> 1
Other	8,392	9,286	9,091	•		: 1
		Manufa	actured p			
				•	•	
Total	11,245	14,446	15,756	20,624	23,021	2
Japan						
West Germany:	,					
United Kingdom:		1,397	1,309			
Belgium:	•	•	522			: 1
Canada			4,408	: 5,783 :	: 6,778 :	2
France:	. , ,					
Hong Kong:	* .					2
Italy:			705	917 :	: 1,016 :	: 1
Netherlands:	148 :				· .	
South Korea:	42 :			,		•
Sweden:	193 :	248	•			
Switzerland:					-	
Taiwan:	58 :	79 :		•		
Other	1,812:	2,191	2,164	2, 668 :	2,887	: 1
•	•			•		1

Source: Official statistics of the U.S. Department of Commerce.

Categories of imports increasing most rapidly

Between 1965 and 1969, U.S. imports of all merchandise increased at an average annual rate (compounded) of 13.9 percent. For imports of manufactured goods, however, the average annual rate of growth during the same period was 19.6 percent. The value of these imports more than doubled, rising from \$11.2 billion in 1965 to \$23.0 billion in 1969.

Table 3 shows import categories with an average annual growth rate greater than 15 percent in 1965-69, i.e., a growth rate above the average for all merchandise imports. The commodity level shown for manufactured goods (sections 5 through 8 of Schedule A) is based on the 3-digit Schedule A code; for other merchandise, the commodity level shown is based on the 2-digit Schedule A code. Only import categories with 1969 imports over \$5 million are included in the table. Rates of growth should be considered in relation to the base from which they are calculated. For example, the spectacular growth in imports of fur clothing and articles made from fur—an annual rate of 57 percent—is based on a 1965 import value of only \$2 million.

Three import categories had annual growth rates above 40 percent. In addition to fur clothing and articles, these included road motor vehicles and parts and electric household equipment. Imports of road motor vehicles and parts rose at an annual rate of 48.5 percent, reflecting the sharp gain in imports from Canada under the U.S.-Canadian automotive agreement and the increased popularity of European and Japanese automobiles in the U.S. market. Electric household machinery (a

category which includes such items as refrigerators and refrigerator equipment, electro-mechanical appliances, and electric shavers) increased 46.8 percent annually.

Eleven commodity groups experienced annual growth rates between 30 and 40 percent. Imports of telecommunications apparatus and parts, which include television receivers, radio receivers, radio-phonograph combinations, loudspeakers, and amplifiers, increased from \$341 million in 1965 to about \$1 billion in 1969—an annual increase of nearly 34 percent. Footwear experienced an annual growth rate of over 32 percent during the same period. Other import categories with growth rates between 30 and 40 percent per year were nonelectric power-generating machinery (mainly automotive engines and parts), electric power machinery, furniture, metal-working machinery, and rubber manufactures (principally rubber tires and tubes).

Among the commodity groups experiencing average annual gains between 20 and 30 percent in 1965-69 were nonelectric machinery and appliances and machine parts (which include centrifuges, pumps, blowers, mechanical handling machinery, nonelectric powered tools, and ball bearings); electric machinery and apparatus such as electron tubes, transistors, semi-conductor devices, starting and ignition equipment, and measuring and controlling instruments; sound recorders and musical instruments, a category which also includes phonographs, tape recorders and record changers; office machines; toys, sporting goods, baby carriages; inorganic chemical elements; base metal manufactures, such as hardware, chains, and springs; rubber and plastic manufactures; machines for special industries; and glass.

Table 3.--United States import categories with average annual growth rates 15 percent or over in 1965-69

Growth rate :		Impo	orts	'Average annual	
Schedule A : code :	Abbreviated commodity description	1965		rate of growth	
. :		Million	Million:		
40 percent :		dollars	.dollars :	Percent	
and over: :		;			
	•	2.0			
	_		: 4,883.3 :		
725:	Electric household equipment	27.4	127.5:	46.8	
30.0-39.9		:	:		
percent: :		:	:		
	Explosives and pyrotechnic products	9.4			
	Iron or steel castings and forgings	3.4			
	Rubber manufactures, finished	: 47.0			
821		59.9			
	Telecommunications apparatus and parts		: 1,005.9 :		
	Structures and parts of metal	7.2			
	Nonelectric power-generating machinery	: 194.6			
851:		: 159.9			
	Pleasure boats, floating structures	: 13.6 : 67.2			
	Electric power machinery Metalworking machinery	: 63.5			
/13:	metalworking machinery	: 63.3	: 102./ :	30.3	
20.0-29.9		:	: :		
percent: :		:	: :		
	Rubber and plastic manufactures, n.e.s.	: 71.1			
	Electric medical and radiological apparatus	: 11.2			
714:	Office machines	: 136.4			
	Sound recorders and musical instruments	: 156.6			
	Electric machinery and apparatus, n.e.s.	: 184.2			
	Paper, paper pulp and articles	: 16.4			
	Equipment for distributing electricity	35.6			
	Synthetic resins and plastic materials	: 40.7			
	Synthetic organic dyes	: 27.1			
	Unworked silver and platinum	: 69.1			
	Nonelectric machinery and appliances, n.e.s.				
	Toys, sporting goods, baby carriages	: 155.4			
	Manufactures of base metals, n.e.s.	: 92.3			
	Machines for special industries	90.0			
	Household equipment of base metals	: 33.2			
	Hand and machine tools	39.7			
	Metal containers for storage and transport	5.8			
513:	Inorganic chemical elements Glass	: 115.3 : 56.6			
:		:	:	:	
15.0-19.9 percent:				•	
<u> </u>	Zinc and zinc alloys	: 43.4	: 88.5	19.5	
	Meat and meat preparations	: 426.5			
	Clothing and accessories		: 1,093.5		
	Aircraft and parts	: 140.5			
	Leather manufactures, n.e.s.	: 10.2			
	Jewelry and related articles	: 33.3	*		
	Organic chemicals	: 160.4			
	Soaps, cleaners, polishes	: 5.1			
	Textile and leather machinery	: 157.2			
	Travel goods, handbags	: 50.0			
	Iron or steel tubes, pipes and fittings	: 143.8			
	Pigments, paints, varnishes	: 4.7			
	Gas: natural and manufactured	: 113.9			
	Scientific and optical equipment	: 178.0			
	Wood manufactures, n.e.s.	: 77.4			
	Miscellaneous food preparations	: 9.8			
09:					
09: 696:	Table flatware and cutlery	: 43.1			

Imports are general imports. Import categories amounting to less than \$5\$ million in 1969 are not included.

Source: Imports are official U.S. Department of Commerce statistics; average annual rates of growth were calculated from these data.

Commodity groups with annual import growth rates between 15 and 20 percent in 1965-69 included clothing and accessories (imports of which rose from around a half-billion to more than \$1 billion); meat and meat preparations (imports of which increased from \$426 million to \$864 million); scientific and optical equipment (including cameras); organic chemicals; textile and leather machinery; aircraft and parts; iron or steel tubes, pipes and fittings; natural and manufactured gas; wood manufactures, such as shingles and shakes, picture and mirror frames, blinds, shutters, shades and screens; and pottery, which includes porcelain or china household ware, and earthenware or stoneware household articles.



Import penetration of U.S. market

A measurement of the degree of import penetration in U.S. industries depends in part on a definition of "industry". An "industry" may be defined broadly or more narrowly, depending on the detail that is desired. For example, the "flat glass" industry can be subdivided into "sheet glass," "plate and float glass," "other flat glass," and "laminated glass." The degree of import penetration that is calculated can thus be markedly affected by the industry or product category definition that is adopted.

To provide a broad overview of the degree of import penetration by industry, 4-digit industries as defined in the Standard Industrial Classification (SIC) were considered. More than 400 manufacturing industries are defined in the SIC, but the differing classification systems used in reporting output and exports and imports make it impossible to develop complete statistics on imports in relation to apparent consumption for each SIC 4-digit industry.

In reviewing the 4-digit industries for which matching output and foreign trade data were available, only industries which showed an import penetration of 10 percent or more in 1968 (latest year of complete data) were selected. The 49 industries thus chosen, shown in table 4, represent SIC industries at the 4-digit level for which complete and comparable statistics on output, exports, and imports were generally available for the period covered. As imports in published U.S. statistics are valued f.o.b.

Table 4.--U.S. imports as a percentage of apparent consumption, specified SIC 4-digit industries, 1960, 1963, 1966-68

Rate of import penetration and industry	SIC	:a	imports pparent	ge of	Value of apparent		
have of import pencoration and industry	number	1960	1963	1966	1967	1968	consumption,
		:	:			: :	
Penetration increased		:	:			:	dollars
Wines and brandy	2084	: 19	: 20	22	23	24	600.4
Vegetable oil mills products, misc	2093						
Animal and marine fats and oils	2094	: 7	: 9	: 11 :	15	: 17 :	632.3
Lace and net goods:	2292	23	: 19 :	23 🕹	25	30 :	74.6
Misc. apparel and accessories	2389	: 3	: 4:	16:	13	: 11 :	150.7
Misc. sawmill and planing mill products	2421	: 14	: 16 :	16:	15	: 18 :	4,485.6
Shingles, cooperage stock, misc		: 19	: 20 :	12:	22	29 :	162.9
Veneer and plywood		-			14	: 16:	2,301.7
Cyclic intermediates and crudes (chemicals)	2815				10	12 :	: 1,677. ¹
Industrial leather belting and packing 2/		_			22	29.:	59.8
Shoes, except rubber 3/		: 3	: 4:	6:	8	: 10 :	3,242.0
Leather gloves and mittens		-			34	: 37 :	108.7
Women's handbags and purses		-		15:	17	: 19:	410.3
Misc. personal leather goods			_		11	: 13 :	
Ceramic wall and floor tile						: 24 :	189
Vitreous china table and kitchen articles	-						
Fine earthenware food utensils		_	•	40 :			96.
Cut stone and stone products:	•				. 8	: 10 :	
Cutlery	٠				11	: 13 :	277
Machine tools, metal cutting types:		• 5	: 5 :	9:	11	: 11:	1,844.6
Textile machinery:	3//-	: 9				: 26 :	740.6
Printing trade machinery:	5-//	: 7	: 8:	8:	10	: 11 :	: 673 . '
Misc. general industrial machinery:		: 12	: 13 :	13:	12	: 16 ;	1,022.9
Sewing machines and parts	3-3-		_			: 54 :	210.
Radio and television sets	3-/-				-	19:	
X-ray and therapeutic apparatus:							
Motorcycles, bicycles and parts		_	_			•	
Watches and clocks:		-	-				
Lapidary work	3,-3				_	• • • • • •	
Musical instruments and parts		_					· .
Misc. games and toys 4/		_	-			•	
Dolls and stuffed toy animals		_					
Buttons	3963	: 8	: 9:	10:	10	: 10 :	109.0
Developed on Access of		:	:	:	1	:	:
Penetration declined :		:	:	: ; :		•	
Carpets and rugs (except woven and tufted):			_			-	
Processed textile waste:	,.	•					
Scouring, combing mill products:			• -	-			
Cordage and twine		_					
Miscellaneous textile goods:					-		
Rubber footwear			-	_			• -
Misc. pottery products:	3269	: 3 6	: 30 :	28 :	~ ~		137.
Watch cases:	3872						
Artificial flowers:	22		: 51 :	48 :	45	: 31	137.
Optical instruments and lenses:	J-5-,		: ;	:		:	
:	1941	20		•	15	: 15	677.9
Department day and antidens last at a 2.2		:	:			:	
Penetration relatively stable :		:	:			: ;	:
Canned and cured seafood:			_		_	_	
Sugar and byproducts:							-,
Pulp mill products:		-		_			
Paper mill products:		-	-				
Medicinals and botanicals:				-	-		
Typewriters and parts	3572.	: 12	: 13 :	13:	12	: 13 :	506.1
		:	: :	:		:	:

^{1/} Percentages are based on value. The value of imports (reported by the Bureau of the Census on a f.o.b. foreign port basis) was adjusted to an estimated landed cost basis by adding an allowance for transportation charges and insurance and the calculated import duty. The value of apparent consumption was calculated by adding imports (on a landed cost basis) to manufacturers' shipments and subtracting from that sum the reported value of exports.

 $[\]frac{2}{1960}$, 1963, and 1966 imports for consumption include 3199 (saddlery, harness and whips, and other leather products, n.e.c.).

products, n.e.c.).
3/ 1960 and 1963 exports include 3142 (house slippers).
1/ 1960 and 1963 exports include 3942 (stuffed animals) and 3943 (sleds).

Source: 1960, 1963, 1966, and 1967, Exports and Imports as Related to Output, Bureau of the Census; 1968, Annual Survey of Manufactures; Imports for Consumption and General Imports, 633-Based Products and Area, Report FT 216: U.S. Exports of December Marcheneses, NIC-Resed Products and Area, Report FT 216: U.S. Exports of December Marcheneses, NIC-Resed Products and Area, Report FT 610. Bureau of the

origin (excluding transportation, insurance, import duties, and other costs), import data were adjusted to an estimated landed cost basis by adding to the reported value of imports an allowance for the excluded cost items. 1/ This procedure aimed at avoiding the understatement that would otherwise result when comparing import value with that of apparent domestic consumption. 2/

Percentages denoting import penetration often move irregularly from year to year. In those instances where the trend in penetration was not clearly evident, the primary basis for designating an industry as having experienced either increased, lessened, or relatively stable market penetration was the comparison of the 1968 percentage with the 1960 percentage. Of the 49 SIC 4-digit industries listed in table 4.

33 show increased penetration of the U.S. market by imports during 1960-68.

The percentages that indicate market penetration of imports are based on value. Different results might have been obtained if units of quantity had been used, rather than value. In those instances where imports consist predominantly of comparatively low unit value items compared with the domestic product, the percentage of import penetration will be smaller than one based on quantity. For example, in 1968 imports of nonrubber footwear comprised 10 percent of apparent

^{1/} Allowance for freight and insurance was based on factors appearing in C.I.F. Value of U.S. Imports, U.S. Tariff Commission, February 7, 1967; data on calculated import duties were obtained from appropriate issues of U.S. Commodity Exports and Imports as Related to Output, Bureau of the Census.

^{2/} The value of apparent consumption was calculated by the following formula (all data in value terms): manufacturers' shipments plus imports (estimated landed cost basis) minus exports.

consumption (on the value basis used in table 4), but 22 percent of apparent consumption on a quantity basis. 1/

It should also be pointed out that the percentage of import penetration calculated for an SIC industry on the 4-digit level can be substantially below the percentage for a 5-digit industry product classification. For example, estimated landed cost of flat glass imports in 1968 represented about 12 percent of that year's apparent consumption (calculated on the same basis as the data in table 4). Yet imports of sheet glass (a 5-digit industry product classification) represented about 30 percent of 1968 apparent consumption of sheet glass as seen in the following tabulation:

Year	Value of impo centage of consump	apparent	Value of appar	rent consump-
		Sheet glass	Flat glass	Sheet glass
	(SIC 3211,	(32111)	(SIC 3211,	(SIC 32111)
	32313)		<u>323</u> 13)	
			Million	Million
•			dollars	dollars
, ,	·- 7.6	22.2	911	179
_	· 9 . 6	24.4	864	178
	10.7	25.4	865	175
1968	12.4	30.5	1,071	202

Value of imports are on an estimated landed cost basis.

When considered on a 5-digit basis, two textile industry product classifications also illustrate increased import penetration. The following tabulation shows the increased percentage that value of

^{1/} U.S. Tariff Commission, Nonrubber Footwear, Report to the President on Investigation No. TEA-I-18, TC Publication 359, January 1971, p. A-84.

imports (landed cost basis) comprised of apparent consumption of men's and boys' woven dress and sport shirts (SIC product code 23214):

	e of imports ercentage of	Value of apparent
Year appare	nt consumption	consumption
		Million dollars
1960	3.0	718
1963	4.6	806
1966	7.6	957
1967	9.2	958
1968	11.6	969
1969	14.6	1,042

For duck and allied fabrics, gray, (SIC product code 22111) the import penetration has been far more pronounced on a quantity basis than on a value basis, as seen from the following tabulation:

	Quanti	.ty	Value	
	Imports as a		Imports(landed	Apparent
	percentage		cost basis) as	con-
	of apparent	Apparent	percentage of	sump-
Year	consumption	consumption	apparent con-	<u>tion</u>
1601	Company	Million square	sumption	Million
		yards		dollars
1962	2.5	285	1.3	134
1963		303	7.6	129
1966		466	12.5	177
1967		460	10.7	226
1968	15.4	423	9.1	180

Factors contributing to the rapid growth of U.S. imports

Output per man-hour, hourly earnings, and unit labor costs 1/

All manufacturing. -- A major determinant of international trade flows are differences in costs among countries. While international comparisons are difficult because of differences in countries' definitions and methods of measurement, available data serve to indicate broadly changes in the U.S. labor cost position compared with other industrial countries. These data, in the form of indexes, do not show differences in absolute levels of unit labor cost, but do indicate changes in the position of the United States compared with other countries. Labor costs usually constitute a major component of total For the U.S. manufacturing sector as a whole, employee compencost. sation amounted to 68 percent of gross product originating in 1969, and in other industrial countries the proportion ranges from about 50 to 70 percent. 2/ A more rapid increase in the unit labor cost index for the United States compared with those for other countries denotes a lessening in competitive capability; conversely, a slower rate of increase in the index compared with those for other countries indicates a strengthening in competitive capability.

^{1/} Foreign unit labor costs in this section are considered mainly in U.S. dollar terms to provide direct comparability with unit labor costs in the United States and hence to better assess the competitive capability of these countries in the U.S. market. As is noted in the text, changed values of foreign currencies by governmental action affect unit labor costs when these are calculated on a U.S. dollar basis rather than in national currency terms.

^{2/ &}quot;Comparative Trends in Manufacturing Unit Labor Costs, Eleven Countries, 1960-70," Monthly Labor Review, Bureau of Labor Statistics, U.S. Department of Labor, August 1971, p. 3.

Table 5 shows indexes of compensation 1/ and output per man-hour and unit labor cost for all employees in manufacturing for the United States and 10 foreign countries for the period 1960-70. The 10 countries listed provided 82 percent of all manufactures imported into the United States in 1969.

While the data show that for the full period 1960-70, the relative increase in the unit labor cost in U.S. manufacturing was less than for most of the countries shown, this is due to the favorable experience of the United States in the first half of the decade, when unit labor costs declined. Between 1965-69, however, unit labor costs in U.S. manufacturing increased more rapidly than for any of the other countries, except Canada. In 1970, the unit labor cost in the United States continued to rise, but several countries—notably West Germany, Italy, the United Kingdom, and Canada—experienced substantially greater increases from the preceding year. Indexes based on 1965 as 100 are shown in table 6. (see also Figures 1 and 2)

For the United States, employee compensation per man-hour in manufacturing rose 19 percent between 1960 and 1965, less than the 23 percent increase in productivity. Consequently, unit labor cost declined by 3 percent during the period. In 1960-65, most of the other countries listed had increases ranging from 12 to 40 percent in their unit labor costs. In all of these countries productivity gains were exceeded by

^{1/} Includes all payments to labor, consisting of wages, salaries, and other direct payments plus legally required and voluntary supplements paid into special employee benefit funds. Employee compensation closely approximates, but is not identical with, labor cost, which comprises all production costs allocable to labor, including such items as non-wage and salary costs of recruitment, training, and various welfare services and facilities, for which annual data are not available.

Table 5 .-- Indexes of compensation per man-hour, output per man-hour, and unit labor cost for all employees in manufacturing, specified countries, 1960-70 1/

	(1960=100)										
	1960	1961	1962	•	1964	1965	1966	1967	1968	1969	1970
	!	:	:	:	·	6 0	•	•			:
United States:	100	: 102	. 307		• 116	: 330	: 30)	:	:	•	•
Compensation per man-hour Output per man-hour		_				_					
Unit labor cost				•	-	•					: 135
onit labor cost	100	101	99	98	98	97	: 100.	: 105	: 107	112	: 118
Belgium:		•	• •	•	•	•	•	•	•		:
Compensation per man-hour	100	105	113	124	138	152	: 166	183	• • 193	. 207	• 020
Output per man-hour					_						232
Unit labor cost					_				//		: 176 : 131
			:			:	:	:	• 121	. 122	; ; T2T
Canada:					:	:	:	:	:	• :	• •
Compensation per man-hour:		97	96:	99	103	: 108	: 116	: 126	: 136	: 147	: 166
Output per man-hour:		-	112 ;	116						-	
Unit labor cost:	100 :	93 :	86 :	85	85	: 86					
France			:	:	•	:	: .	•	:	•	:
France: :	100	110	101	700		:	:	:	:	:	:
Compensation per man-hour: Output per man-hour:	100:									2 06	212
Unit labor cost	100:	105 :					.135				: 175
onic labor cost	100 :	105 :	111:	115	118	: 120	120	123	: 130	124	: 121
West Germany:	•	•				:	:	•	:	:	:
Compensation per man-hour:	100	116 :	132	143	154	168	. 702		:		•
Output per man-hour:	100 :	105								-	289
Unit labor cost:	100:	110 :					142				
:	:			120 .	120	. <u>.</u> .	: 129	129	: 127	135	: 166
Italy:	•	:			'	• •	• •				
Compensation per man-hour:	100:	106:	124 :	148 :	166	180	183	202	216	237	281
Output per man-hour:	100:	104:	114:	118:	125						•
Unit labor cost:	100:	102:	109:	126:		_					•
_ · ·	:	:	:	:	:	:	:	-5-	:		:
Japan:	:		:	:		: :	: :	:	: :	;	:
Compensation per man-hour:	100:	116:	133 :	148 :	167 :				269	318	372
Output per man-hour:		114:	118:	128 :	145 :				218	251	289
Unit labor cost:	100:	102 :	113:	116:	115 :	125	124 :	122 ;	123	127	129
Netherlands:	:	:	:	:			;	: ;	:	:	:
Compensation per man-hour:	100 :	119 :	126	120 :	162	177		:		;	:
Output per man-hour:	100:	105:	108:	139:	161:						304
Unit labor cost	100:	113:	117:	112 : 124 :	123 :				,		-
		• c	ة إنست	1E4 :	131 :	140 :	148	154 :	153	157	15 9
Sweden: 2/	:	•	•			i :				:	:
Compensation per man-hour:	100 :	108	120 :	131	142	157	172	190	207	232	261
Output per man-hour:	100:	10ի ։	111:	118:	131 :						-
Unit labor cost:	100 :	104:	108	110 :	108 :					191 :	
•	:	:	:	:					. AA/ 3	121	130
Switzerland: 3/	:	. :	:	:	:						•
Compensation per man-hour:	100:	106 :	114:	123 :	133	144	155	164		- 6- '	196
Output per man-hour:	100:	100:	99:	102:	107 :	113 :		· 124	131		
Unit labor cost:	100 :	106:	115:	121 :	125:	128:	131 :	132 :	132	-	
Mited Kingdom;	:	:	:	:	:		•	-		,	
Compensation per man hour:	300 -	:	•		:	•	:	. :	:		;
Output per man-hour:	100:	107:	112:	117:	125 :		154 :	149:	142:	154:	175
Unit labor cost:	100:	101:	103:	108:	115:						
CHILD TONOT COBP	100:	107 :	110:	109:	110:	117:	126:	119:			
1/ Commencetton non man hour		<u>:</u>		<u>:</u>	:	:	:	·			

^{1/} Compensation per man-hour and labor costs are on a U.S. dollar basis. Par value or prevailing exchange rates were used to convert data from a national currency to a U.S. dollar basis. 2/ Mining and manufacturing.
3/ Wage earners only.

The 1970 data for all countries are preliminary estimates, as are the data for the following countries and earlier years: Belgium, Japan, West Germany, Sweden, 1969; Canada, 1967-69; France, 1966-69; Netherlands, 1968-69.

Source: "Comparative Trends in Manufacturing Unit Labor Costs, Eleven Countries, 1960-70," Monthly Labor Review, August 1971, Bureau of Labor Statistics, U.S. Department of Labor.

Table 6.--Indexes of compensation per man-hour, output per man-hour, and unit labor cost for all employees in manufacturing, specified countries, 1965-70 1/

•	-,-,				•	
	(1965:	=100)				
	1965	196 6	1967	1968	1969	1970
United States:			:	:		
Compensation per man-hour	100	104	110	. 777		
Output per man-hour						
Unit labor cost						
			• 100		116	121
Belgium:				•		
Compensation per man-hour	100	109	120	127	136	152
Cutput per man-hour						
Unit labor cost	100					
			:			1
Canada:	3	: :		: ;		· }
Compensation per man-hour:		108 :	: 117 :	126 :	137	153
Output per man-hour		,	105	: 111 :	115	
Unit labor cost	100 :	105 :	112 :	: 114 :	119	131
	:	: :	:	:	:	}
France:		1	:	;	;	}
Compensation per man-hour:				_	-	
Output per man-hour:						
Unit labor cost:	100 :	100 :	103 :	108	103	101
West Germany:				;	;	•
Compensation per man=hour:	100	100	221		; ; ;	
Output per man-hour						170
Unit labor cost						•
CHIC LEBOT COBC	100 :	105	104	103 :	110	134
Italy:	•	•	,			
Compensation per man-hour:	100:	102	112	120	132	157
Output per man-hour:						
Unit labor cost		98				
:	:	:				
Japan:	:	:	:	:	:	
Compensation per man-hour:	100:	110:		144 :	170 :	199
Output per man-hour:	100:	111:	127 :	145 :	167 :	192
Unit labor cost:	100:	99:	98:	99:	102:	104
Wetherlands	:	:	:	:	:	
Netherlands: : Compensation per man-hour:	300	:		•	:	
Output per man-hour:	100:	112:				
Unit labor cost:	100:	106:		-		
onto modi confirmation:	100 :	106 :	110 :	110 :	113 :	114
Sweden: 2/		•	•		•	
Compensation per man-hour-:	100 :	109 :	121	132	147 :	166
Output per man-hour:		106:				
Unit labor cost:	100:	104:	106 :		-	116
:		:			109.	110
Switzerland: 3/	:	:	:	:	•	,
Compensation per man-hour:	100:	108 :				136
Output per man-hour:	100:	105 :				134
Unit labor cost:	100:	103:	104 :	103:		101
:	:	:	:	1	1	
United Kingdom:	•	:	•			
Compensation per man-hour:	100:	110 :	108:	103:	112	127
Output per man-hour:	100:	103:	106:	112 :		119
Unit labor cost:	100:	107 :	102:	92:	97 :	107
	:	:	<u>.</u>			
1/ Compensation per man-hour	and uni	lt labo	r costs	are on	a II.S	doller

^{2/} Compensation per man-hour and unit labor costs are on a U.S. dollar basis. Par value or prevailing exchange rates were used to convert data from a national currency to a U.S. dollar basis.

^{2/} Mining and manufacturing.
3/ Wage earners only.

The 1970 data for all countries are preliminary estimates, as are the data for the following countries and earlier years: Belgium, Japan, West Germany, Sweden, 1969; Canada, 1967-69; France, 1966-69; Netherlands, 1968-69.

increases in employee compensation per man hour. Canada was an exception; its unit labor cost (in U.S. dollar terms) dropped 14 percent during 1960-65, attributable mainly to the establishment in May 1962 of a par value for the Canadian dollar below the previous freely fluctuating rate.

In 1965-69, the index of employee compensation per man-hour in U.S. manufacturing rose 25 percent, whereas the productivity index rose only 8 percent. As a result, the unit labor cost in manufacturing rose 16 percent during the period, far more than the increase in the unit labor cost for most of the other countries shown. Only in Canada was there an increase exceeding that of the United States. For Japan, the unit labor cost index for all manufactures during 1966-68 was actually below the 1965 level, and although rising in 1969, the index that year was only 2 percent above 1965, compared with 16 percent for the United States. A leap of 67 percent in productivity in Japan (an average gain of about 14 percent per year) nearly offset the substantial increase in employee compensation per man-hour.

Changes in labor compensation, productivity, and unit labor costs in manufacturing in the United States and other countries, in terms of average annual rates of change and the change in 1970 are shown in table 7. The deterioration in the unit labor cost position of the United States in the 1960's, particularly when compared with Japan, is evident from the data. In the 1965-69 period, the unit labor cost in U.S. manufacturing increased an average of 3.7 percent per year, whereas that in

Japan's manufacturing increased an average of only 0.5 percent per year. This contrasted with changes in 1960-65, when the U.S. unit labor cost declined an annual average of 0.6 percent, while that of Japan rose by an annual average of 4.6 percent. In both periods, compensation per man-hour in Japan rose at substantially more rapid rates than in the United States. However, productivity gains in Japan-equal to twice the average U.S. rate of gain in 1960-65 and more than six times the average U.S. rate of gain in 1965-69-curbed the increase in Japanese unit labor costs, particularly in the 1965-69 period.

The deterioration in the U.S. labor cost position in the latter half of the 1960's is also evidenced by a comparison of average rates of change with other foreign countries, except Canada. In 1965-69, the 3.7 percent average annual rate of increase for the United States was the highest of any country. Belgium and France experienced average annual increases of less than 1 percent, while the rates for West Germany, Italy, and the Netherlands were between 2 and 2-1/2 percent. The unit labor cost of the United Kingdom (in U.S. dollar terms) declined in 1968 and 1969, reflecting the devaluation of the pound sterling in November 1967. In terms of its national currency, unit labor costs in the United Kingdom continued to rise almost uninterruptedly during 1965-69.

The 3 percent average annual rate of decline in Canada's unit labor cost (in U.S. dollar terms) during 1960-65 was attributable both to gains

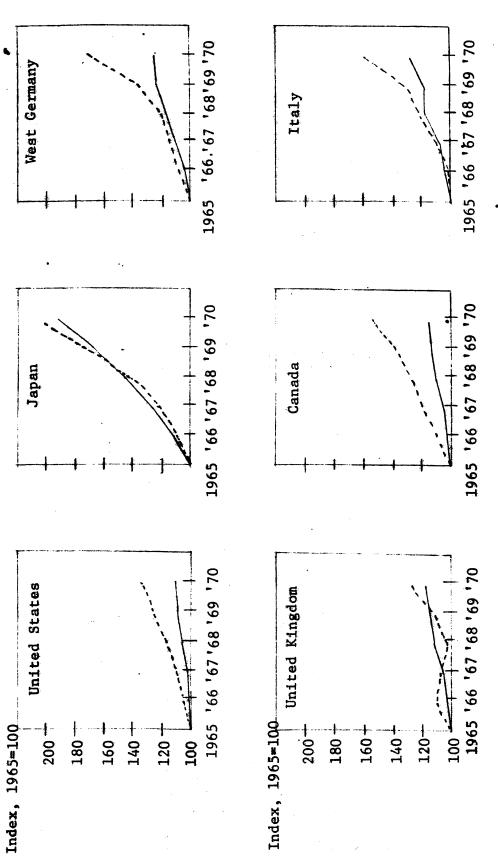
Table 7.--Percentage changes in compensation per man-hour, output per man-hour and unit labor cost, all employees in manufacturing, specified countries and periods

•	Comp	ensation 1	Compensation per man-hour	••	Outpu	Output per man-hour	: inou-usi	Unit	Unit labor cost	
Country	Average annual percentage change	ennual change	Percentage change	De .	Average annual percentage change	nnual :	Percentage change	Average annual percentage change	ennual ;	Percentage change
	1960-65 : 1965-69	1965-69	1969 to 1970	51	1960-65 : 19	1965-69	1969 to 1970	<u> 1960-65</u> :	1965-69	1969 to 1970
United States:	3.6 :	2.8	7.9	· ••	4.2 :	2.0	1.9 :	-0.6	3.7	4.3
Japan	13.3:	14.2	17.1		8.4 :	13.7 :	15.0 :	. 9.4	, r	2.0
Belgium	8.7	8.0	: 11.8	••	5.1 :	7.2	. 6.4	3.6	 -	6.8
Canada:	1.6:	8.2	11.7	••	1.7	3.6	: F.T	-3.0 :	त. त.	10.1
France:	8.8	7.7	3.0	••	5.1 :	7.0	2.4	3.7 :	~	-2.0
		α	Ĉ				. 4 c		4	21.8
T+o 3	. n or	, c	0 87			,	4		2.0	13.9
Netherlands:	12.3	11.2	10.4		5.1 :	0.0	9.6	7.0 :	3.1	6,
Sweden 1/:	7.6	10.1	12.9	••	7.1 :	8.0	5.1 :	2.3:	2.2	t-9
Switzerland 2/:	7.6	4.9	6.5		2.5	7.0	: 1.4	5.1 :	0	1.5
United Kingdom:	6.5	2.9	13.4	••	3.4 :	3.6 :	3.5 :	. a.e.	9.0-	: 10.3
••	••			••	••	••				

1/ Mining and manufacturing. 2/ Wage earners only.

Source: Derived from tables 5 and 6.

Figure 1. -- Employee compensation and output per man-hour in manufacturing

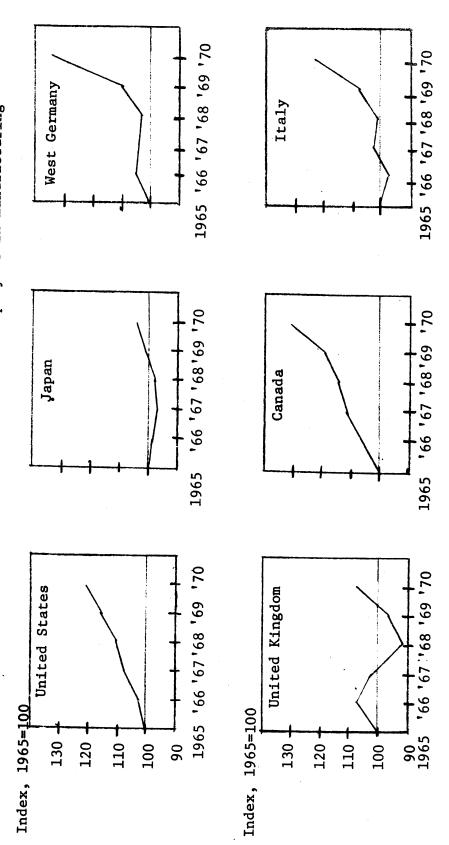


Compensation per man-hour is on a U.S. dollar basis.

Output per man-hour.

- - - Compensation per man-hour.

Unit labor cost for all employees in manufacturing Figure 2.



Unit labor costs are on a U.S. dollar basis.

in productivity and the 1962 exchange rate adjustment. A reversal occurred in 1965-69, however, when a sharp rise in employee compensation and a moderation in the rate of productivity gain resulted in an average annual increase of nearly $4\frac{1}{2}$ percent in unit labor cost, exceeding that of the United States.

The contrast in the unit labor cost position of U.S. manufacturing in the second half of the 1960's compared with the first half reflected a widening gap between advances in employee compensation and productivity—a phase of the 1965-69 inflationary experience associated with the escalation of the U.S. effort in Vietnam. During the period from 1960 to 1965, the GNP deflator—the most comprehensive index of price change for the Nation's total output—rose 1.4 percent per year; in the 1965-69 period it rose 3.7 percent per year. During 1960-65, the GNP deflator for manufacturing rose only 0.3 percent per year, considerably less than the average increase of 1.4 percent for all industries. During 1965-69, however, the GNP deflator for manufacturing rose 2.3 percent per year, closer to the 3.7 percent per year increase for all industries. 1/

The median first year wage increase in U.S. manufacturing under major collective bargaining agreements (covering 1,000 workers or more) ranged between 2.2 percent and 4.1 percent in 1960-65. By 1967, this had risen to 6.4 percent and was 6.9 and 7.0 percent, respectively, in

^{1/} Report to the National Commission on Productivity by the Council of Economic Advisors (Inflation Alert), Aug. 7, 1970, Appendix B, pp. B-1, B-2.

1968 and 1969. 1 In the first 9 months of 1970, it had risen further to 8.0 percent. 2

The U.S. unit labor cost in manufacturing increased further in 1970, but unlike the situation in 1965-69, several other industrial countries experienced sharply greater increases, notably West Germany, Italy, United Kingdom, and Canada. In most countries considered in this report, the rate of increase in labor compensation accelerated in 1970, but the increases (in U.S. dollar terms) that occurred in West Germany, Italy, United Kingdom, and Japan greatly exceeded the increase in the United States. In Japan, however, a continued large gain in productivity--highest of any of the countries--kept the 1970 rise in unit labor cost to 2.0 percent, compared with 4.3 percent for the United States. In West Germany and Italy, productivity gains dropped off from the average of the 1960's, and in the face of large increases in labor compensation, unit labor costs jumped 22 and 14 percent, respectively. ward revaluation of the Deutche mark in October 1969 also contributed to the following year's rise in West Germany's unit labor cost in U.S. dol-The productivity gain in the United Kingdom in 1970 was about in line with the average of the 1960's, but as it fell far short of the increase in employee compensation, the unit labor cost advanced 10 percent. Canada also experienced a 10 percent increase in its unit labor cost in 1970; employee compensation (in U.S. dollar terms) increased

^{1/} Current Wage Developments, Apr. 1, 1970, Bureau of Labor Statistics, U.S. Department of Labor.

^{2/} Economic Report of the President, transmitted to the Congress February 1971, p. 58.

substantially, due partly to the changed value of the Canadian dollar after its unpegging in June 1970, whereas the productivity gain was far below that averaged in the 1960's. The unit labor cost in France (in U.S. dollar terms) declined 2 percent in 1970, as a consequence of the franc devaluation in August 1969; in national currency terms, the unit labor cost rose 5 percent.

While the trend in unit labor cost is a good indicator of cost competitiveness, since it takes account of variations in productivity, an examination of differences in average hourly compensation of employees is also useful. To the extent that productivity in U.S. manufacturing fails to offset differences between domestic and foreign average hourly returns to employees in any given year, unit labor costs in the United States will be higher than abroad. 1/

Average hourly compensation of production workers in U.S. manufacturing rose from \$2.64 an hour in 1960 to \$3.89 in 1969, or by 47 percent. This percentage increase was lower than nearly all the other countries (Canada was an exception), but this is because the percentage increase for the U.S. is calculated on a larger base. Hourly compensation in the other countries, excluding Canada, ranged from the equivalent of 29 cents an hour (Japan) to \$1.28 (Sweden) in 1960, and from 91 cents an hour (Japan) to \$2.82 (Sweden) in 1969. Canada's average

^{1/} Hourly compensation consists of hourly earnings plus supplementary or fringe benefits received by workers. Supplementary benefits vary amon countries and are equivalent to a substantial percentage of hourly earnin in some. For this reason, comparisons among countries are more valid whe based on hourly compensation than when based on hourly earnings. Supplements include employer contributions for social insurance; private pension health, and welfare funds; and other legally required and voluntary supplements provided in kind or paid directly to the employee or into special employee benefit funds. (Payments in kind include such benefits as free meals, food, and housing.) Nonbenefit payments, such as recruitment and training, are not included, although they are labor costs incurred by employers. Strict comparability of labor compensation data may not always be possible because of differences in concepts, scope, and systems of compensation in the various countries and in fringe benefit programs.

Table 8.--United States and foreign hourly compensation of production workers in manufacturing, 1960, 1963, 1966, and 1969

Country	1960	1963	1966	1969	Percentage increase 1960 to 1969	Foreign compensation as a per- centage of U.S.		Difference: U compensation minus foreign compensation	5 4 5
	-U.S.	dollars	per hour-		Percent	Percent	ent	: <u>1960</u> :U.S. dollars	1969 s per hour
United States:	2.64	2.93	3.29	3.89	<u>1</u> 77	1	1		•
Japan	.29	14.	. 57	.9	213	#	23	2.35	2.98
West Germany	. 85	1.19	1.52	1.85	118	32	84	1.79	2.04
United Kingdom	.85	66.	1.22	1.32	55	35	37	1.79	2.57
Belgium	87	1.06	1.42	1.74	100	33	45	1.77	2.15
Canada	2.16	2.11	2.46	3.04.	14	82	78	84.	.85
France	.81	1.04	1.22	1.57	ਰੈਨ	31	01	1.83	2.32
Italy	. 62	8.	1.12	1.39	124	23	36	2.02	2.50
Netherlands	99.	46. :	1.30	1.72	191	25	प्रा	1.98	2.17
Sweden	1.28	1.64	2.16	2.82	120	84	72	1.36	1.07

Note: Hourly compensation includes average hourly earnings plus estimated supplementary (fringe) benefits. Par value or prevailing exchange rates were used to convert from national currency to U.S. dollars.

Source: Bureau of Labor Statistics estimates.

hourly compensation was approximately four-fifths of the U.S. rate in both years. If absolute increases are considered, the gap between average hourly compensation in U.S. manufacturing and in that of the other industrial countries (except Sweden) widened appreciably in the 1960-69 period. (See table &) Japan's average hourly compensation of production workers in manufacturing more than tripled between 1960 and 1969, compared with the 47 percent gain for the United States. In absolute terms, however, the Japanese rate was \$2.98 per hour below the U.S. average in 1969, compared with a difference of \$2.35 in 1960.

Estimated hourly compensation of all employees (including nonproduction personnel) in manufacturing (table 9) show similar trends as for production workers: generally larger relative increases than in the United States between 1960 and 1969 but a widened absolute gap.

As indicated earlier, differences in productivity must be taken into account when reviewing labor compensation data to determine differences in unit labor cost. Data on productivity levels in "all manufacturing" in foreign countries in relation to U.S. manufacturing are not available. However, based on estimated comparative data for 1960 adjusted to 1969 and 1970 levels by using indexes of output per manhour shown in table 5, it is possible to adjust hourly compensation data to allow for estimated differences in productivity. The following tabulation shows 1969 and 1970 hourly compensation of all employees in manufacturing in foreign countries as a percentage of U.S. average hourly compensation, after allowing for estimated differences in productivity:

Percentage of U.S. average hourly compensation, adjusted for estimated differences in

Country	product	tivity
	1969	1970
	40	40
Japan West Germany	61	72
United Kingdom	65	68
Belgium	60	61
Canada	79	82
France	58	54
Italy	62	67
Netherlands	74	71
Sweden	72	74

The foregoing data represent, for 1969 and 1970, respectively, the estimated percentage of U.S. hourly compensation required on the average in each country to produce a quantity of manufactured goods equivalent to that produced in the United States. Even when estimated differences in productivity are taken into consideration, hourly compensation in the countries considered are lower than in the United States, and lowest in Japan. It should be kept in mind, however, that trends in unit labor costs for all manufacturing combined do not necessarily reflect comparative trends in individual industries or products.

Table 9.--United States and foreign hourly compensation of all employees in manufacturing, 1960, 1963, 1966, and 1969

Country	1960	1963	1966	1969	Percentage increase, 1960 to 1969	Foreign compensation as a percentage of U.S. compensation	compen- s a per- of U.S.	: Difference: U.S. compensation minus foreign compensation	U.S. Ion ign
••••	U.S.	dollars	per	hour	Percent	1960 Percent	1969 Percent	1960 U.S. dollars	1969 per hour
United States	3.01	3.34	3.75	: 84.4	: 6t	1		e	0
Japan	.32	. T4.	.65	1.01	216	11	23	5.69	3.47
West Germany:	.92	1.31	1.69	2.10 :	128	31	L4	5.09	2.38
United Kingdom:	.97	1.14	1.47	1.49	: 45	32	33	2.04	2.99
Belgium:	1.00	1.23	1.65	2.06	106	33	97	2.01	2.42
Canada	2.34	2.30	2.72	3.46	: 81	78	77	79.	1.02
France:	96.	1.27	1.57	1.96 :	101	32	††	2.05	2.52
Italy	.77	1.13	1.41	1.82	136	56	11	2.24	5.66
Netherlands	.79	1.09	1.59	2.18	176	56	64	2.22	м. ЭС.
Sweden	1,41	1.84	2.42	3.27 :	132 :	L17	73	1.60	1.21

Note: Hourly compensation includes estimated supplementary (fringe) benefits. Par value or prevailing exchange rates were used to convert from national currency to U.S. dollars.

Source: Bureau of Labor Statistics estimates.

Basic metal industries

Available data indicate recent trends in the basic metals industries—primary iron and steel and nonferrous metals—have generally been similar to those for "all manufacturing." In the United States, an increase in output per man-hour during 1960-65 that exceeded a rise in hourly earnings 1/ lowered the unit labor cost by 5 percent. Among the other countries for which such data are available, only Canada experienced a reduction in its unit labor cost during this period. In Italy, France, West Germany, Belgium, and Japan unit labor costs advanced.

During 1965-68 (the latest year for which data are available), the index of hourly earnings increased nearly 12 percent in the United States, whereas output per man-hour declined 5 percent. The result was an 18 percent increase in unit labor cost. This contrasted with declines of about 8 to 11 percent in unit labor costs for Japan, West Germany, Belgium and Italy. Based on these data, unit labor costs in Canada rose 10 percent between 1965 and 1968, less than in the United States. (See Table 10.)

If Hourly earnings as used in this discussion represent average gross money wages per wage earner. They differ from labor compensation chiefly in that they do not include employer contributions to legally required insurance programs and private welfare plans for benefit of employees.

Table 10. -- Indexes of hourly earnings, output per man-hour, and unit labor costs for all employees in the basic metal industries, 1960-1968 1/

(1960=100)1960 1961 1962 1963 1964 1968 1965 1966 1967 United States: 108: Hourly earnings----: 100: 104: 106: 111: 117: 113: 119: 126 Output per man-hour--: 100: 112: 120: 103: 106: 119: 119: 117: 113 100: Unit labor cost----: 100: 100: 96: 93: 95: 98: 102: 112 Belgium: Hourly earnings----: 100: 101: 108: 117: 130: 140: 150: 157: 164 Output per man-hour---: 100: 103: 107: 113: 125: 128: 140: 148: 170 Unit labor cost----: 100: 98: 100: 104: 104: 109: 107: 106: 97 Canada: 104: 96: 98: Hourly earnings----: 100: 100: 105: 109: 116: 124 Output per man-hour---: 100: 107: 108: 112: 118: 121: 117: 119: 129 Unit labor cost----: 100: 97: 89: 87: 85 : 87: 93: 98 : 96 : France: 127: 147: 121: 140: Hourly earnings----: 100: 110: 133: 155: 179 111: Output per man-hour---: 100: 101: 101: 103: 103: 120: Unit labor cost----: 100: 109: 119: 123: 119: 136 : 123: West Germany: • 113: 138: 100: 129: Hourly earnings----: 123: 150: 157: 163: 171 Output per man-hour---: 100: 109: 105: 105: 119: 123: 119: 136: 153 104: Unit labor cost----: 100: 117: 123: 116: 122: 133: 120: 112 Italy: Hourly earnings----: 100: 106: 117: 137: 146: 155: 161: 170: 176 Output per man-hour---: 100: 107: 108 : 146: 102: 112: 174: 187: 185 104: Unit labor cost----: 100: 110: 127: 130 : 106: 93: Japan: Hourly earnings----: 100: 110: 120: 130: 142: 157: 175: 199: 227 Output per man-hour---: 100: 110: 108: 120: 142: 169: 145: 205: 229 111: 108: 100: 100: 100: Unit labor cost----: 108 : 103: 97: 99

Source: Derived from Industrial Production, Historical Statistics, OECD; Yearbook of Labor Statistics, International Labor Office; Employment and Earnings Statistics for the United States, 1909-68 and Monthly Labor Review, U.S. Department of Labor.

^{1/} Primary iron and steel and nonferrous metals. Hourly earnings index are on a U.S. dollar basis; adjustments were made to allow for the upward revaluation of the German mark in March 1961 and the pegging of the Canadian dollar in May 1962.

^{2/} Not available.

Wholesale price indexes

Prices of industrial raw materials. -- In the 1960-69 period, the relative position of the United States with respect to industrial raw materials prices improved compared with some industrial countries and worsened compared with others. Prices of industrial raw materials in the United States increased 12 percent in 1960-69 (table 11). This increase was less than experienced by Japan, the United Kingdom, Canada, France and Sweden, but greater than in West Germany, Italy, Belgium, the Netherlands, and Switzerland. The impact of inflation in the United States, however, is reflected in the index for the latter half of the Between 1960 and 1964, the U.S. index actually declined 3 percent, and although increasing in 1965 it stood only 2 percent above 1960, the smallest rise of any of the listed countries. Between 1965 and 1969, the U.S. index rose 10 percent. Other countries have also experienced inflation, and several had increases in industrial raw materials prices in 1965-69 that exceeded those in the United States. The indexes rose 15 percent in Japan and the United Kingdom, and 13 percent in Canada and France. In Sweden, the increase slackened to 7 percent in 1965-69 from a 1960-65 advance of 16 percent, highest of any of the other countries. Countries with relatively small changes in industrial raw material prices in 1965-69 were Belgium, Italy, West Germany, the Netherlands, and Switzerland.

Table 11 -- Wholesale price indexes of industrial raw materials, 1960-69

(1960=100)1964 1965 1966 1967 1968 1961 1963 1969 Country 1960 1962 101: 98 : United States ---: 100: 100: 97: 102: 109: 103: 105: 112 98: Belgium----: 100: 96: 97: 103: 103: 102: 97: 97: 100 Canada----: 100: 101: 107: 108: 108: 116: 110: 117: 119: 124 100: 104: 104 .: 106: 113: 114: 116: 114: 116: 129 France----: 100: 100: 100: 101: 103: 106: 107: West Germany ---: 103: 99: 102 100: 98: 98: 102: 106: 107: 108: 112: 113: Italy----: 110 100: 106: 103: 107: 108: 116: 121: 109: 119: Japan----125 100: 97: 96: 104: 103: 107: 106: 106: Netherlands----: 97: 106 Sweden-----100: 101: 102: 106: 112: 116: 120: 116: 118: 124 100: 100: 101: 103: 105: Switzerland----: 105: 106: 105: 105: 109 United Kingdom --: 100: 99: 99: 101: 105: 107: 109: 109: 119: 123

Source: United Nations, Monthly Bulletin of Statistics; OECD, Main Economic Indicators and Historical Statistics, 1957-66.

Wholesale prices of manufactured goods

The wholesale price index of manufactured goods in the United States was remarkably stable between 1960 and 1964, the index on an unrounded basis varying only between 100.0 and 100.4 percent of 1960. This stability contrasted with the situation in other industrial countries, where wholesale prices of manufactured goods generally advanced in 1960-64, by percentages ranging from 3 percent (Japan) to 12 percent (Sweden).

During 1965-69, however, wholesale prices of manufactured goods in the United States rose steadily each year, and by 1969 were 12 percent above 1965. This was the steepest climb in prices of any of the other countries except Canada (see Table 12). Percentage increases in the wholesale price index for manufactures during 1965-69, by countries, were as follows:

Country	Percent	Country Percent
United States-	12	Italy 5
Japan	9	Netherlands 7
West Germany *-	2	Sweden 10
United Kingdom	8	Switzerland 8
Belgium	6	
Canada	13	

^{*} The apparent decline in the index for West Germany is due to the exclusion of the value added tax which went into effect on January 1, 1968 (see page 38).

Table 12.--Wholesale price indexes of manufactured goods, 1960-69

		***************************************		(1960 =	100)					
Country	1960	1961	: 1962 :	: 1963 :	1964	1965	1966	1967	1968	1969
United States	100	100	: 100	: 100	100	102	105	107	110	114
Belgium	100	100	: 100	: 102	106	108	110	111	112	115
Canada	100	101	: 103	: 105	106	108	111 :	113	116	122
France <u>1</u> /	100	103	: 104	: 107	111	111	114	113	112	<u>2</u> /
Italy <u>3</u> /	100	100	: 101	: 106	110	111	111	112	: 112	: 116
West Germany 3/-	100	102	: 104	: 105	107	110	112	111	105	108
Japan:	100	101	: 101	: 103	103	105	107	108	: 112	114
Netherlands:	100	100	: 101	: 103	109	111	118	119	: : 122	: 119
Sweden:	100	102	: 104	: 106	: 112	115	119	119	: 120	127
Switzerland 3/:	100	100	: 100	: 99	104	105	107	105	: 106	: 113
United Kingdom 4/	100	103	: : 104	: : 105	108	112	112	113	: : 118	121

^{1/} Industrial products.

Source: Organization for Economic Co-operation and Development, Main Economic Indicators; Historical Statistics, 1957-66. Annuaire Statistique de la France, 1969.

^{2/} Not available.
3/ Weighted average index of major sub-sectors of manufacturing.
4/ Excluding food--home market sales.

Wholesale prices of electrical machinery

The U.S. wholesale price index for electrical machinery declined 5 percent between 1960 and 1965, but thereafter rose steadily. By 1969, the index was 3 percent above 1960 and 8 percent above 1965. By contrast, the wholesale price index for electrical machinery in Japan trended downwards during this period, and by 1969 was 13 percent below 1960 and 2 percent below 1965.

In West Germany, the wholesale price index for electrical machinery increased between 1960 and 1967, and in the latter year was 4 percent above 1960, whereas the 1967 index in the United States was even with the 1960 index. On January 1, 1968, however, a value-added tax went into effect in West Germany, in accordance with the tax harmonization program of the European Economic Community which calls for a tax on value-added in all Common Market Countries. The 1968 and 1969 indexes do not include the new value added taxes, and the German index dropped from 104 in 1967 (1960=100) to 98 in 1968, rising to 100 in 1969. Exports are not subject to value-added tax; the exporter is reimbursed for whatever assessments he may have been called upon to pay. Hence, the German indexes in 1968 and 1969 are indicative of the competitive position of West German electrical machinery as far as exports are concerned. In 1969, the West German index on the new basis was 5 percent below 1965, whereas the U.S. index was 8 percent above 1965.

In Canada, the wholesale price index for electrical machinery during 1961-69 remained below the 1960 level. By 1969, the Canadian index was 4 percent above 1965, compared with the 8 percent rise in the United States.

Table 13. -- Wholesale price indexes of electrical machinery, specified countries, 1960-69

				1960=100)	(
	1960	1961	1962	1963	1961	1965	1966	1961	1968	1969
United States	100	96	96	96	- 36	95	26	100	102	103
Japan	100	95	91	68	88	89	89	68	88	87
Canada 1/	100	93	76	95	95	76	76	66	95	86
West Germany 2/	100	101	102	101	102	105	901	104	86	100
	100	102	105	יי דרו	110	109	118	117	117	121
United Kingdom $3/$:	100	101	103	103	105	108	111		116	120
THESTER STEET / L	T manidom [ח שייסת			•		•	•	•	

The 1968 and 1969 figures exclude turnover tax. 1/ Heavy electrical machinery.
2/ "Electro-technical products." The 3/ "Electrical engineering industry." "Heavy electrical machinery." "Electro-technical products."

Source: Numbers in parentheses refer to the sources listed on page 75: United States (1); Japan (10,11); Canada (4); West Germany (6); Italy (8); United Kingdom (15).

On the other hand, Italy and the United Kingdom both experienced increases in electrical machinery wholesale prices that outstripped the increases in the United States. By 1969, the indexes in both countries were about 20 percent above 1960 and 11 percent above 1965; increases for the United States were 3 percent above 1960 and 8 percent above 1965.

Wholesale prices of nonelectrical machinery

Indexes of wholesale prices of nonelectrical machinery are available only for the six countries shown in table 14: United States, Japan, West Germany, Canada, Italy, and the United Kingdom.

The U.S. wholesale price index of nonelectrical machinery increased steadily throughout the 1960's, with the rate of increase accelerating in the last half of the decade. Between 1960 and 1965, the index rose 6 percent; between 1965 and 1969 the index jumped 16 percent, the largest increase during that period for any of the countries listed.

Wholesale prices for nonelectrical machinery in Japan, as measured by that country's index, declined slightly between 1960 and 1965, but then increased in the following years. The 1969 index, however, was 7 percent above 1965, compared with the 16 percent rise for the United States.

In West Germany, Italy, and the United Kingdom, between 1960 and 1965 the wholesale price indexes rose more rapidly than in the United States, but the rate of increase slowed between 1965 and 1969. In West Germany, the index actually dropped between 1967 and 1968, due to exclusion of the value-added tax which went into effect on January 1, 1968. (Value-added taxes in the European Common Market are refunded to the exporter.)

Canadian wholesale prices for nonelectrical machinery were relatively stable through 1966, rising moderately thereafter. The percentage increase in the 1969 index over the 1965 index for individual countries were as follows:

Country	Perc	entage	increase
United States		16	
Japan		7	
West Germany		3	
Canada		5	
Italy		6	
United Kingdom		13	

Table 14_{\bullet} --Wholesale price indexes of nonelectrical machinery, specified countries, 1960-69

			(.19	1960=100)						
Country	1960	1961	1965	1963	1961	1965	1966	1961	1968	1969
United States 1/:	100	101	102	104	107	106	110	113	118	123
Japan	100	101	10.1	100	66	66	100	103 ::	105 :	106
West Germany 2/	100	105	109	.110	1.13	1118	121	.122	115:	121
Canada 3/	300	100	66	100	100	101	101	102	104	106
Tbaly	300	103	107	115	117	118	119	120	122 :	125
United Kingdom $\frac{1}{4}$:	100	102	103	104	106	110	1174	116	. 611	124
1/ Derived from data in Wholesale Pri 2/ The 1968 and 1969 figures exclude 3/ Machinery: Household, office, and 1/1 Mechanical engineering industry.	a in Wh 9 figur nold, o	in Wholesale figures exclu ld, office, a	Prices arude turnorand store.	ld F	4 1	Indexes, B	Bureau o	of Labor	Statistics.	ics

Source: Numbers in parentheses refer to sources listed on page 75% United States (1); Japan (10 and 11); West Germany (5); Canada (4); Italy (8); United Kingdom (15).

Wholesale prices of chemicals

The U.S. wholesale price index for chemicals remained relatively steady throughout the 1960's, and the 1969 index was 2 percent below 1960 and only 1 percent above 1965. This relative stability in wholesale prices contrasted with price rises for Belgium, Canada, France, Netherlands, Switzerland, Sweden, and, during the last half of the 1960's, the United Kingdom. Prices in Japan, however, trended downwards throughout the decade, and the 1969 index was 12 percent below 1960 and 7 percent below 1965. The price index in West Germany also remained below the 1960 level, although the drop between 1967 and 1968 was probably due to the exclusion of the value-added tax which went into effect January 1, 1968. The 1969 index for West Germany was 10 percent below 1960 and 9 percent below 1965. While 1969 indexes for a few countries are not yet available, their probable level can be gauged from the 1968 figures. It is likely that compared with 1960, only the Japanese and West German wholesale price indexes in 1969 were lower than the United States index.

Table 15.--Wholesale price indexes of chemicals, specified countries, 1960-59

			(1	1960=100				,		
Country	1960	1961	1962	1963	1961	1965	1966	1961	1968	1969
United States:	100	66	26	96	76	2.6	86	98	86	86
Belgium	100	86	86	86	101	102	104	105	105	107
Canada	700	100	101	101	102	106	110	113	114	117
France	100	101	66	66	101	102	103	105	10t	7
West Germany $2/$	100	66	76	95	95	66	86	76	91	8
Italy 3/	100	66	98	101	107	110	111	110	901	901
Japan	100	86	75	93	ま	95	95	16	89	88
: Netherlands	100	%	97	. 26	100	104	109	110	2112	7
Sweden 4/	100	1000	86	76	66	104	105	107	108	108
: Switzerland:	100	66	103	105	105	106	901	108	108	104
United Kingdom	100	100	86	100	100	101	101	102	105	106
				•						

1/ Not available. 2/ Includes coal. The 1968 and 1969 figures exclude turnover tax. 3/ "Chemicals and fertilizers." $\frac{3}{4}$ "Chemico-technical products."

Source: Numbers in parentheses refer to the sources listed on page 75: United States (1); Belgium (2); Canada (4); France (5); West Germany (6); Italy (7); Japan (10); Netherlands (12); Sweden (13); Switzerland (14); United Kingdom (15).

Wholesale prices of textiles

Between 1960 and 1967, the U.S. wholesale price index for textiles was relatively stable, varying only between 99 and 101 (1960=100). contrasted with considerable fluctuations in the indexes for other countries listed in table 17; by 1967 the indexes for all except Belgium and Switzerland were substantially above the 1960 level. In 1968 and 1969, however, the U.S. index rose 4 percent and 2 percent, respectively, placing the 1969 index 6 percent above 1967. This was the biggest increase in the 2 years for any country except France and the United Kingdom. Although the index for Japanese textiles fluctuated considerably between 1960 and 1967, it remained relatively stable in 1968 and 1969 in contrast to the increase in the U.S. index. The index for West Germany dropped between 1967 and 1968, probably reflecting the exclusion of the valueadded tax that went into effect January 1, 1968 (see p. 38); in 1969, the index was 3 percent below 1967. The 1969 indexes for Belgium, Canada, Italy, and Switzerland were from 1 to 3 percent above 1967, compared with The 1969 index for the the 6 percent increase for the United States. Netherlands declined slightly, while that for Sweden showed no change compared with 1967.

Table 17.--Wholesale price indexes of textiles, specified countries, 1960-69

				(19	(1960=100)					
Country	1960	1961	1965	1963	1961	1965	9961	1961	1968	1969
United States:	100	66	100	100	101	101	101	101	105	107
Belgium	100	102	8	104	107	101	103	66	100	102
Canada	100	102	105	108	108	107	109	110	112	112
France	100	101	105	114	119	114	117	114	911	124
West Germany	100	102	102	104	106	108	109	108	103	105
Italy	100	, 001	106	111	116	113	911	118	118	122
Japan	100	101	66	108	105	102	103	109	011	109
Netherlands	100	102	102	103	108	110	113	115	911	114
Sweden	100	102	103	105	108	109	111	211	נננ	112
Switzerland	100	66	101	105	107	103	101	16	97	8
United Kingdom:	100	103	102	103	901	107	108	107	111	115
Source: Monthly Bull	lletin	of Stat	Statistics,	United	Nations	1	Statistical	Office.		

Export price indexes

All manufactured goods.--Average prices of U.S. exports of manufactured goods, as indicated by the index of export unit value, were stable from 1960 to 1964, rising only 1 percent during the period. Six countries--Switzerland, West Germany, United Kingdom, the Netherlands, Sweden, and France--experienced more sizable increases in their export prices, ranging from 4 to 12 percent. On the other hand, export prices of Japan and Canada dropped 9 and 6 percent, respectively, during the period. Export prices for Japan, in particular, dropped steadily until 1966, when the index stood 12 percent below 1960.

The index of export prices of most countries rose from 1965 to 1969, but it is significant that export prices of most foreign countries increased less than did those of the United States. Apparently, most foreign countries were successful in keeping their export prices more immune to price-cost inflation than was the United States. U.S. export prices rose 3 percent in 1965 and continued to increase by about 3 percent a year for the next three years, rising 4 percent from 1968 to 1969. By 1969, the index was 13 percent above 1965. This increase compared with those experienced by other countries during 1965-69 as follows:

Country	Percent	Country	Percent
United States-	13	Canada	15
Japan	7	France	5
West Germany	 5	Netherlands	-1
United Kingdom-	2	Sweden	10
Belgium	4	Switzerland	13

British exercise es in 1969, in dollar terms, were still below the pre-1967, accordance evel.

Table 18.--Export unit value indexes for manufactured goods, 1960 - 1969

(1960 = 100)1962 : 1963 : 1964 : 1965 : 1966 : 1967 : 1960 : 1961 : 1968 : Country 1969 100: 100: 100 : United States---: 101: 101: 104: 107: 110: 113: 118 100: 100: Belgium----: 100: 99: 101: 102: 104: 104: 106 102: Canada----: 100: 95: 92: 92: 94: 95: 97: 105: 99: 109 France----: 100: 101: 101: 104: 106: 101: 109: 108: 110: 111 108: West Germany---: 100: 105: 108: 108: 110: 112: 112: 110: 115 Italy----: 100: 96: 92: 98: 100: 98: 97: 97: 94: 1/ 100: 96: 94: Japan----: 92: 91: 90: 88: 91: 92: 96 Netherlands---: 100: 104: 103: 103: 106: 107: 107: 106: 104: 106 101: Sweden----: 100: 101: 103: 105: 109: 114: 107: 112: 118 Switzerland----: 100: 101: 104: 109 : 112: 122: 115: 125 : 129: 130 United Kingdom--: 100: 101: 103: 105: 107: 111: 116: 116: 110: 113

Note. -- Indexes are on a U.S. dollar basis.

Source: Monthly Bulletin of Statistics, Statistical Office of the United Nations.

^{1/} Not available.

Despite the rise in Japan's export prices between 1967 and 1969, the 1969 index was still 4 percent below 1960. The data available for Italy indicate that its export prices for most years during 1961-68 also were below 1960. By contrast, the increase in U.S. export prices occurring principally in the last half of the decade carried the 1969 index to 18 percent above 1960, higher than for any country except Switzerland and Sweden.

Export prices and wholesale prices, all manufactures.—Data on wholesale prices and export unit values of manufactured goods are brought together in Table 19 to facilitate comparison (see also Figure 3). For countries experiencing revaluation of their currencies since 1960, indexes of export unit values are also shown on a national currency basis for comparison with internal wholesale price indexes.

The only countries whose export prices increased at a faster rate than their wholesale prices were the United States, Switzerland, the United Kingdom (on a national currency basis), and West Germany (on a U.S. dollar basis). The devaluation of the pound sterling in November 1967 lowered British export prices in terms of the dollar, and as already indicated, these prices in 1969 were below the pre-1967 devaluation level.

Japan's export prices for manufactured goods declined between 1960 and 1966, despite an increase in its wholesale price index. By 1969, although the wholesale price indexes of manufactured goods in both Japan and the United States were 14 percent above 1960, export prices of the United States were 18 percent above 1960, whereas export prices of Japan were 4 percent below 1960.

West Germany's wholesale price index for manufactured goods is estimated to have risen less than in the United States, and during most of the 1960's its export price index in terms of national currency increased more slowly than did its wholesale price index. The upward revaluation of the mark in March 1961 and again in October 1969, however, raised these export prices in dollar terms, diminishing the advantage that would have otherwise accrued.

A similar situation prevailed in the case of the Netherlands, which also revalued its currency upwards by 5 percent in March 1961. From 1960 to 1969, wholesale prices of manufactured goods rose 19 percent (compared with 14 percent in the United States), yet the index of export unit value went up only 1 percent on a national currency basis and only 6 percent on a U.S. dollar basis.

The wholesale price index for manufactured goods in Canada rose 22 percent in 1960-69, compared with 14 percent for the United States. Yet the index of Canadian export prices in national currency terms rose less than the wholesale price index--by 18 percent. The competitive advantage of Canada was enhanced by the establishment of a par value of $92\frac{1}{2}$ Canadian cents to 1 U.S. dollar in May 1962. Thus, in dollar terms, the index of Canadian export prices rose 9 percent between 1960 and 1969, half the percentage increase for U.S. export prices.

The wholesale price index for manufactured goods in Belgium rose 15 percent in 1960-69, slightly more than in the United States, but its index of export unit value rose only 6 percent during the period contrasted with the 18 percent increase for the United States.

Table 19.--Manufactured goods: Indexes of wholesale prices and export unit values, specified countries, $1960-69\ \underline{1}/$

(1960=100)1964 Country and index 1960 1961 1962 1963 1965 1966 1967 1968 1969 United States: 100: 100: 100: 100: 102: Wholesale prices-----100: 105 107 114 Export unit value----: 100: 101: 100: 100: 101: 104: 107: Japan: Wholesale prices----: 101: 105: 100: 101: 103: 103: 107 114 Export unit value----: 91: 100: 96: 94: 90: 92: 88: 96 West Germany: Wholesale prices 2/---: 100: 102: 104: 105: 107: 108 110: 112 111: 105 : Export unit value: 103: National currency basis -: 100: 101: 103: 103: 105 : 107: 108 U.S. dollar basis----: 100: 105: 108: 108: 108: 110: 115 : United Kingdom: 100: 103: 104: 105: 108: 112: Wholesale prices----: 112: 113: 118: Export unit value----: 100: 101: 103: 105: 107: 111: 116 :<u>3</u>/118 :<u>3</u>/125 :<u>3</u>/ 129 Belgium: Wholesale prices----: 106: 100: 100: 100: 102: 108: 110: 111: 112 115 Export unit value---: 100: 100: 100: 99: 101: 102: 104: 104: 106 Wholesale prices----: 100: 101: 103: 105: 106: 108: 111: 116 122 113 Export unit value: National currency basis-: 100: 99: 98: 99: 103: 105 118 95: 100: 92: 92: 94: 95 :-97: 99 105: 109 U.S. dollar basis----: France: 100: 103: 104: 114: Wholesale prices 4/---: 107 : 111: 111 : 113: 112 Export unit value----: 100: 101: 101: 101: 104: 106: 109: 108 $1\overline{1}1$ 110 Italy: Wholesale prices 2/----: 100: 100: 101: 106: 116 110: 111: 111: 112 112 Export unit value----: 100: 96: 92: 98: 100: 98: 97: 97: <u>5</u>/ Netherlands: Wholesale prices----: 100 100 101: 103 109 111: 118 119 122 119 Export unit value: 98: 98: 101: 101: 101 National currency basis-: 100: 100: 102: 102: 100 104: 103: 103: 106: 107 107: 106 104 106 U.S. dollar basis----: Sweden: 127 Wholesale prices----: 100: 102: 104: 106: 13.2 : 115: 119: 119 Export unit value----: 107: 109: 100: 101: 101: 103: 105: 112: 118 Switzerland: 99: 105: 106 Wholesale prices 2/---: 100 : 101: 100: 104 : 107: 105: 113 Export unit value----: 100: 101 : 204 : 109 : 112: 115: 122: 125:

Source: Monthly Bulletin of Statistics, Statistical Office of the United Nations; OECD, Main Economic Indicators and Historical Statistics, 1957-66; Annuaire Statistique de la France, 1969

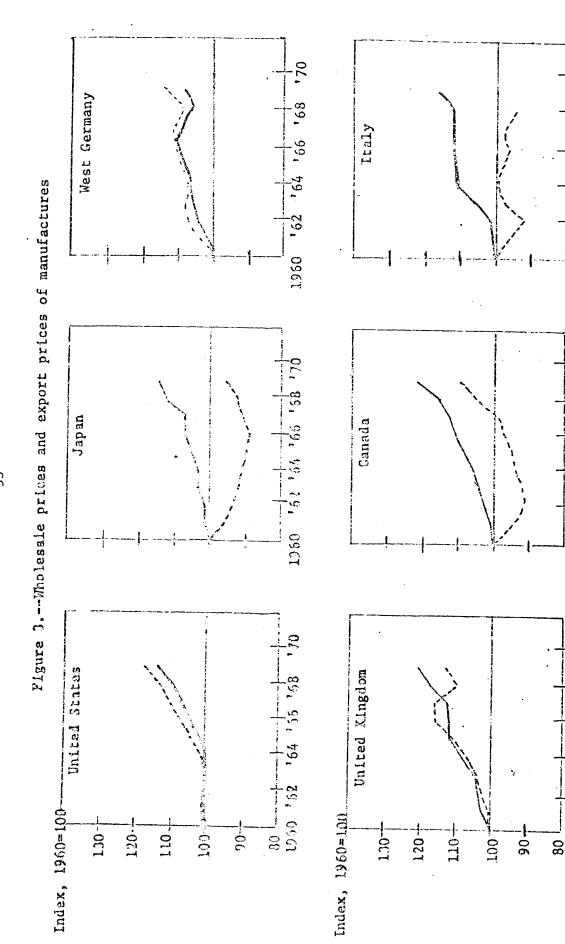
^{1/} Export unit value indexes for countries whose currencies were revalued prior to 1967 are shown separately on a national currency and U.S. dollar basis. Unit value indexes for other countries are the same on a national currency and dollar basis, unless otherwise noted.

^{2/} Weighted average index of major sub-sectors of manufacturing.

^{3/} In dollar terms after the devaluation of November 1967, the indexes for 1967, 1968, and 1969 were 116, 110, and 113, respectively.

^{4/} Industrial products.

 $[\]frac{5}{5}$ / Not available.



Indexes of export prices are on a U.S. dollar basis.

1960 '62 '64 '65 '68

1960 '62. '64 '66 '68 '70

1960 '62 '64 '66

Wholesale prices.

Other industrial countries also experienced increases in export prices that were less than occurred in their domestic wholesale prices.

In France, the wholesale price index of industrial products rose 12 percent between 1960 and 1968, while the export unit value index of manufactured products rose 10 percent. In Italy, the wholesale price index is estimated to have risen 12 percent between 1960 and 1968, whereas the index of export prices declined 6 percent during those years.

Sweden's index of wholesale prices of manufactured goods jumped 27 percent from 1960 to 1969, compared with 14 percent for the United States. However, the rise in export prices for Sweden during 1960-69--18 percentalthough the same as for the United States was substantially below the increase in its wholesale price index for manufactured products.

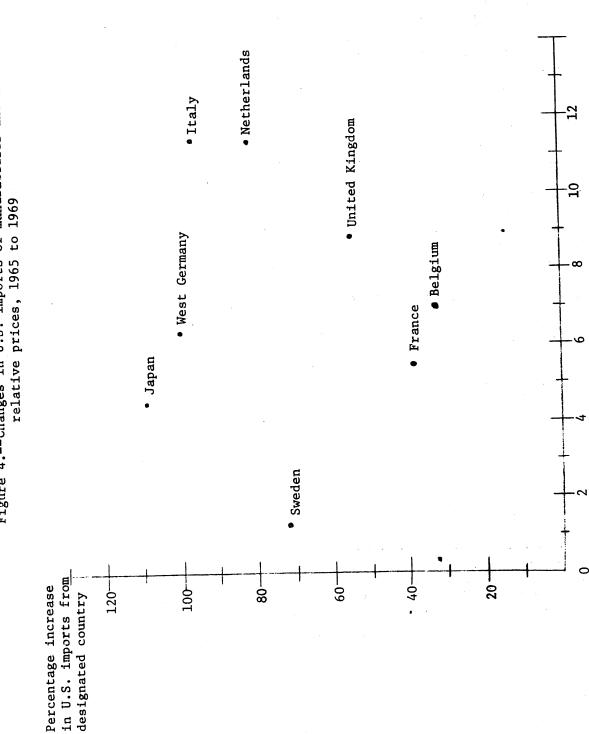
The foregoing discussion compared changes in foreign indexes of average export unit value with wholesale price indexes in the respective country to show the extent to which export prices followed the trend of internal prices. Another indication of changes in price competitiveness is a comparison of foreign export prices with U.S. wholesale prices for manufactured goods. During 1960-69, export prices (in U.S. dollar terms) of the following countries generally rose less than the U.S. wholesale price index of manufactured goods: Japan, Belgium, Canada, France, and Italy. Countries whose export prices generally rose more rapidly than the U.S. wholesale price index were West Germany, United Kingdom (prior to the devaluation of 1967), Sweden, and Switzerland. Considering the shorter period 1965-69, however, the export unit values of each country,

with the exception of Canada and Switzerland, rose less than the whole-sale price index of manufactured goods in the United States.

Dividing the export unit value indexes for each foreign country by the U.S. wholesale price index for the corresponding year (all indexes on a common base year) yields "price ratios" which provide some indication as to whether foreign manufactured goods, on the average, are becoming less expensive or more expensive relative to U.S. manufactured goods. Figure 4 compares the percentage change from 1965 to 1969 in these price ratios with the percentage increases occurring in U.S. imports of manufactures from each country during the same period. No clear pattern is evident. 1/ In another section of this report (see page 69), a multiple regression analysis is used in an effort to evaluate the influence of price on imports of manufactures from U.S. principal suppliers.

^{1/} A least-squares regression between the two variables yielded an r² of .02. Canada and Switzerland were not included in the analysis, the former because of the stimulation to U.S. imports arising from the automotive trade agreement, and the latter because of an expansion in U.S. imports from that source despite an increase in relative prices.

Figure 4.--Changes in U.S. Imports of manufactures and in relative prices, 1965 to 1969



* Relative prices represent foreign export unit value indexes for manufactures divided by the U.S. wholesale price index for manufactures.

Percentage decrease in foreign prices relative to U.S. price.*

Export unit values and export shares

Most Western industrial countries whose export prices in the 1960-69 period rose relatively less than those of the United States experienced a greater relative increase in exports of manufactured products. The U.S. index of export unit value for manufactures in 1969 was 18 percent above 1960; exports during the period about doubled. The comparable index for Japan declined 4 percent during the period, while its exports of manufactures more than quadrupled. For Italy, the index of export unit value also declined below the 1960 level, and 1969 exports of manufactures were more than $3\frac{1}{2}$ times those of 1960. Other countries whose export prices rose less than those of the United States in 1960-69 and which experienced relatively greater increases in exports of manufactures were West Germany, Belgium, Canada, France, and the Netherlands. (See table 20)

Between 1960 and 1969, the U.S. share of the combined exports of manufactures of 11 industrial countries fell from about 24 percent to 20 percent. By contrast, the share for Japan rose from less than 7 percent to 11 percent, and the share for Italy increased from 5 percent to more than 7 percent. Other countries increasing their relative share of the combined exports of manufactures were West Germany, Belgium, Canada, and the Netherlands (table 21). It must be borne in mind, however, that changes in a country's share of total exports may be due not only to changes in competitive position but also to shifts in market distribution and shifts in commodity composition. 1/

^{1/} See, for example, Mordechai E. Kreinen, "Price Elasticities in International Trade," Review of Economics and Statistics, November 1967.

Table 20.--Manufactured products: Indexes of export unit values and exports and export shares, specified countries

Country	Index of export unit value, 1969	Index, value of exports,	Expo shar perc	es 2/,
	(1960=100)	(1960=100)	1960	1969
United States	118	209	23.9	19.9
Japan	96	416	6.7	11.1
West Germany	115	261	18.8	19.5
United Kingdom	113	176	15.5	10.9
Belgium	106	271	5 . 7	6.2
Canada	109	337	4.7	6.3
France	111	218	9•5	8.2
Italy	<u>1</u> / 94	364	5.0	7.2
Netherlands	106	281	4.0	4.4
Sweden	118	267	3.0	3.2
Switzerland	130	243	3.2	3.1

^{1/} Index for 1968; 1969 index not available.

Source: Tables 18 and 21.

^{2/} Share of the combined exports of the 11 listed countries.

Table 21.--Exports of manufactured products, specified countries, 1960-69

Year	United . States	Japan	West Germany	United Kingdom	Belgium	Canada :	France	italy:	Nether- lands	Sweden :	Switzer- land	Total, listed countries
•	•• ••				• Va	Value (millions	of	dollars)	·			
1960	12,788	3,603	10,058	8,319	3,059:	2,518:	•••	2,686:	2,116:	1,605:	1,728:	53,546
1961	: 12,874	3,762	: 11,208	8,637	3,173:	2,521:	,211:	3,153:	2,204	1,795:	1,873:	56,411
1962	: 13,841 :	4,349	: 11,738	8,832	3,488 :	2,633:	to1:	3,515:	2,361:	1,993:	2,031:	60, 182
1963	: 14,469 :	1,921	12,910	: 6,427 :	3,829	2,830:	••	3,876:	2,711:	2,195 :	2,195:	65,204
3.964	: 16,642 :	690,9	14,394	• 006.6 •	4,558	3,440 :	: 7/2 :	7,666	3,331:	2,498:	2,410:	74,382
1965	: 17,288	7,778	15,906	: 11,179:	5,204:	3,803:	,325 :	5,609 :	3,652:	2,746 :	2,696:	83,186
1966	: 19,152 :	9,046	: 18,013	: 11,967 :	5,607	. 608,4	. 365	6,412:	3,999 :	3,059:	2,981:	93,007
1967	: 50,769 :	9,758	: 19,480	: 11,779 :	5,745 :	5,886:	••	6,980 :	4,253	3,330	3,181:	99,611
1968	: 23,653 :	18,21	22,276	: 12,665	6,700	7,335 :	••	8,386:	4,887	3,645 :	3,598 :	114,718
1969	26,780	14,971	26,221	: 14,617 :	8,281:	9,491:	120	9,776	5,944 :	4,279:	4,203:	134,584
	••					Percent	of total					
1960	23.9	5.7	18.8	15.5:	5.7:	4.7 :	9.5 :	5.0 :	t 0°	3.0 :	3.2:	100,0
1961	22.8:	6.7	19.9	: 15.3:	. 9.6	4.5 :	9.2	5.6:	6.60	3.2	3.3:	10000
1962	23.0:	7.2	19.5	: 14.7 :	5.8 :	* †•†	9.0	5.8 :	3.9 :	" " " "	3.4 :	100.0
1963:	22.1:	7.5	19.8	: 14.5 :	5.9 :	4.3	0.6	5.9	4.2	3.4 :	3°4 :	100.0
1961	22.3	8	19,3	13.3	6.2	7.0	8.7 :	6.3	4.5 :	3.4 :	3.2 :	100.0
1965	20.8	1 00	19.1	13.4:	6.3 :	7. 9. 17	8.8	6.7	• †•†	3.3	3.2 :	100.0
1966	20.5 :	2.4	19.4	: 12.9 :	0.9	5.2 :	8.6:	6.9	4.3 :	3.3:	3.2:	100.0
1967	20.8	80	19.6	: 11.8:	5.8	5.9.	8.5.	7.0	t.3	3.3:	3.2	100.0
1968	: 20.7 :	10.6	19.4	: 11.0	5.8	. 4.9	8.2.	7.3:	t-3 :	3.2:	3.1:	100.0
1969	: 19.9:	11.1	19.5	: 10.9 :	6.2	6.3 :	8.2	7.2 :	። ተ • ተ	3.2	3.1:	100.0
	**		••	••	••		••	••	••	••	••	•
"Manı	"Manufactured products"	products	s" comprise	e Sections	5 through	8 of the	Standard I	International	onal Trade	e Classification	_	sirc).

Source: Commodity Trade Statistics, Statistical Papers, Series D, United Nations; Statistics of Foreign Trade, Organization for Economic Co-operation and Development (OECD); Japanese Economic Statistics, Japanese Economic Planning Agency.

Although the export unit value index of the United Kingdom in 1969 was below that of the United States, this was primarily due to the devaluation of the pound sterling in November 1967. Between 1962 and 1967, export prices of the United Kingdom had risen more rapidly than those of the United States and most of the other countries. The relative increase in U.K. exports of manufactures between 1960 and 1969 was the smallest of the 11 industrial countries considered, and the U.K. share of the combined exports of manufactures dropped from about $15\frac{1}{2}$ percent to about 11 percent during the period.

Exports of manufactures during 1960-69, for the United States and 10 other industrial countries, by broad category, are shown in appendix These tables show that while U.S. exports of the tables 15-21. individual categories increased absolutely in the 1960-69 period, its share of the combined total for the ll countries declined in each The latter development is also indicated by category considered. table 22, which shows the percentage share of the United States and selected countries in 1969 compared with 1960, for specified categories Japan's share increased substantially for each of manufactures. category shown, except textiles (SITC 5), while Italy's share rose in each category. As in the case of the United States, the export shares of the United Kingdom declined in each category. Germany and Canada, the shares in some categories gained, while those The jump in Canada's share of transport equipment in others declined. exports is primarily due to the sharp increase in its exports of road motor vehicles, mainly to the United States under the automotive products trade agreement between the two countries.

Table 22.--Percentage share of exports of specified categories of manufactured goods, selected countries, 1960 and 1969 1/

Category and year	United States	Japan :	West Germany	United Kingdom	Canada	Italy
Base metals: 1960 1969				-		
Electrical machinery: 1960 1969		6.9 16.3		-		
Nonelectrical machinery: 1960	_				2.6 4.0	
Transport		5.0 10.5				
Chemicals: 1960 1969						_
Textiles: 1960 1969		20.7 20.4			°•7	
Other manufac- tures: 1960		9.5 12.3		-	8.3 5.6	

^{1/} Shares represent percentages of combined exports of the 11 industrial countries listed in table 21 and appendix tables 15-21.

Source: Appendix tables 15-21.

Selected manufactures. -- This section considers the relationships during 1966-68 between movements in wholesale price indexes, average export unit values, and in value of exports of chemicals, textiles, nonelectrical machinery, and electrical machinery, for the United States and for certain competitor countries. Export unit value indexes for broad SITC categories, such as chemicals or textiles, can be calculated from national foreign trade statistics, but only for countries that publish summary data both for value and quantity, or for those countries where calculation of such summary totals is feasible. For the United States, these calculations were practicable for the years 1966-69, but 1969 data for several foreign competitors were not available. Thus, for those countries where data were available, comparisons were made for the years 1966-68. In addition to the limitation of a short period, it should be borne in mind that average unit export values calculated for broad commodity groups reflect changes in composition as well as changes in prices.

Chemicals. -- In seven countries -- the United States, Japan, West Germany, the United Kingdom, 1/ Italy, the Netherlands, and Switzerland -- lower average export unit values were accompanied by increased total value of exports. (See Figure 5) In general, however, there was not a close correspondence between changes in wholesale prices in these countries and in their average export unit values;

^{1/} The 1968 export unit value index of the United Kingdom was adjusted for the devaluation of the British pound in November 1967.

in the United States, for example, the export unit value declined 18 percent although the wholesale price index remained unchanged. In France and Belgium, the value of exports increased, despite the fact that between 1966 and 1968 the average unit values for each rose in excess of the increase in the wholesale price index.

Textiles. In five countries—West Germany, Italy, the Netherlands, Switzerland, and Belgium—total value of exports increased while average export unit values declined; in two of these countries, however, wholesale prices increased whereas in the other three, wholesale prices decreased. In the United States, the average export unit value and total value of exports declined by 7 and 6 percent, respectively, while the wholesale price index rose 4 percent. In Japan, the average unit export value rose more slowly than the wholesale price index, and total value of exports increased 13 percent. The average export unit value of the United Kingdom (in U.S. dollar terms) dropped after devaluation of the British pound; the total value of exports remained 2 percent below 1966. The French wholesale price index and average unit export value each declined 1 percent, and total value of exports rose by 6 percent (See Figure 6).

Nonelectrical machinery. In the United States, the rise in the export unit value of nonelectrical machinery was more than twice the rise in the wholesale price index. (See Figure 7) In Japan, however, tl

average export unit value rose in line with the wholesale price index. Between 1966 and 1968, the value of Japanese exports increased 44 percent, compared with a 14 percent gain for the United States. The United Kingdom devaluation of the pound converted a rise in average export unit value, in national currency terms, to a 4 percent decline in U.S. dollar terms; the value of exports increased 5 percent. Both for Italy and Belgium, the gain in export unit value was below that in the wholesale price index and exports of both countries rose substantially.

Electrical machinery. Data enabling comparisons for electrical machinery are available for the United States, West Germany, and Italy. In the United States, the increase in the export unit value was several times the increase in wholesale prices; value of exports rose 20 percent. West German exports also increased 20 percent, along with a small rise in the average export unit value. In Italy, on the other hand, the drop in average unit export value was far greater than the small decline in wholesale prices; value of exports rose 41 percent. (See Figure 8)

Figure 5.--Percentage changes in wholesale prices, export unit values, and exports of chemicals, 1966 to 1969

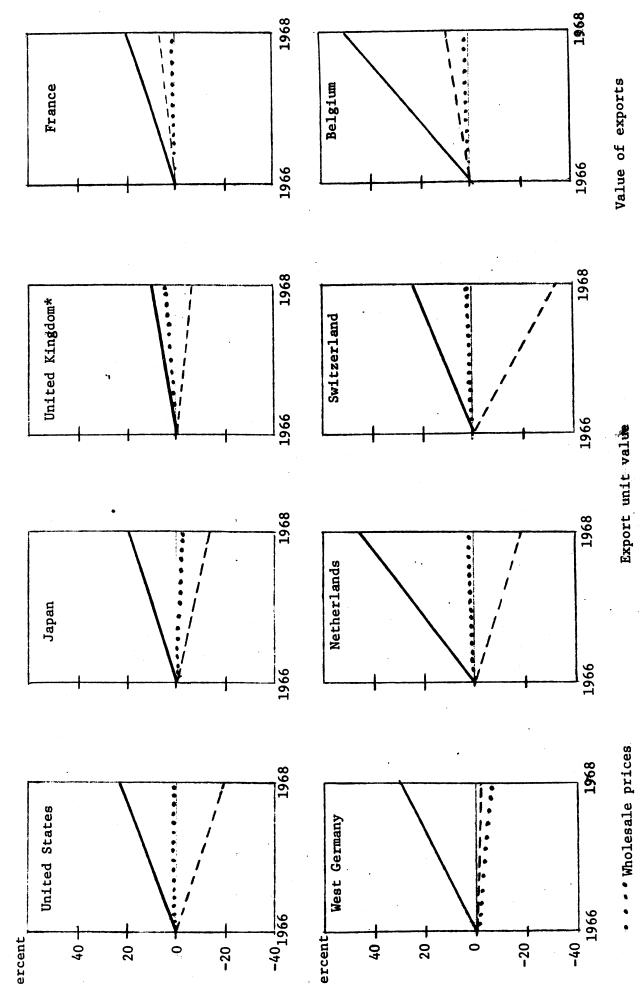
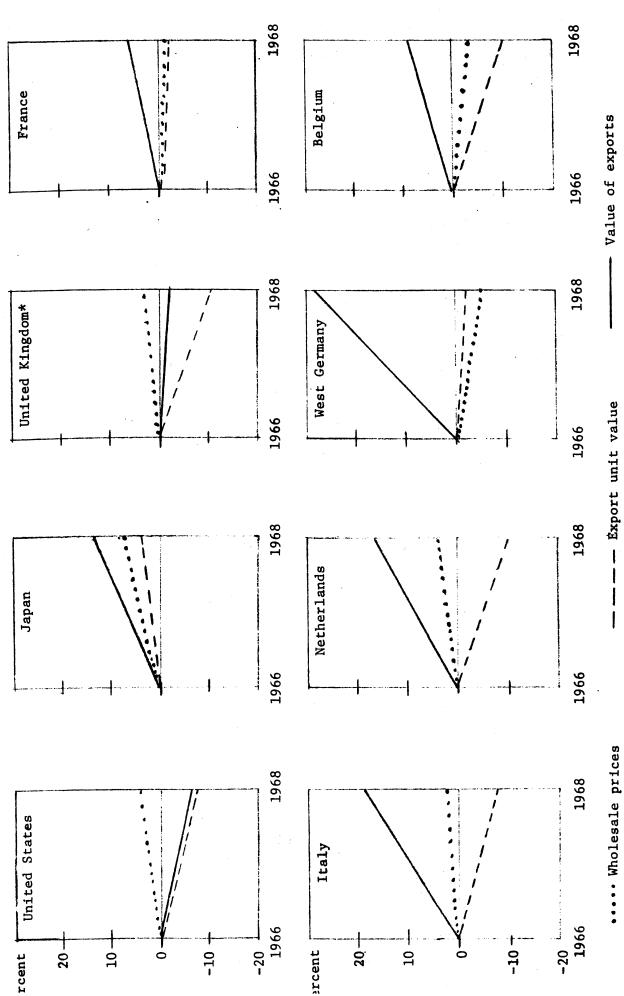


Figure 6.--Percentage changes in wholesale prices, export unit values, and exports of textiles, 1966 to 1968



* 1968 export unit value Index adjusted for devaluation of pound in November 1967.

Figure 7.--Percentage changes in wholesale prices, export unit values, and exports of non-electrical machinery, 1966 to 1968

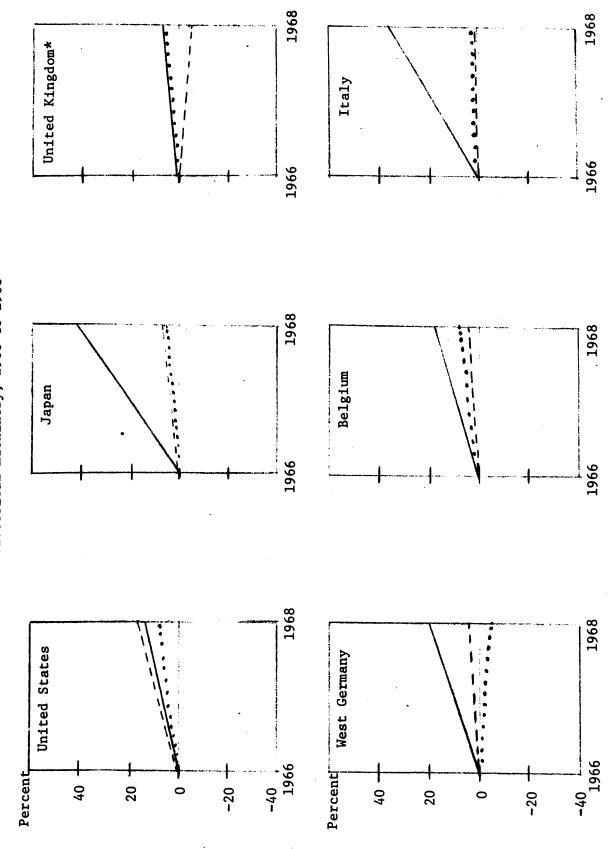
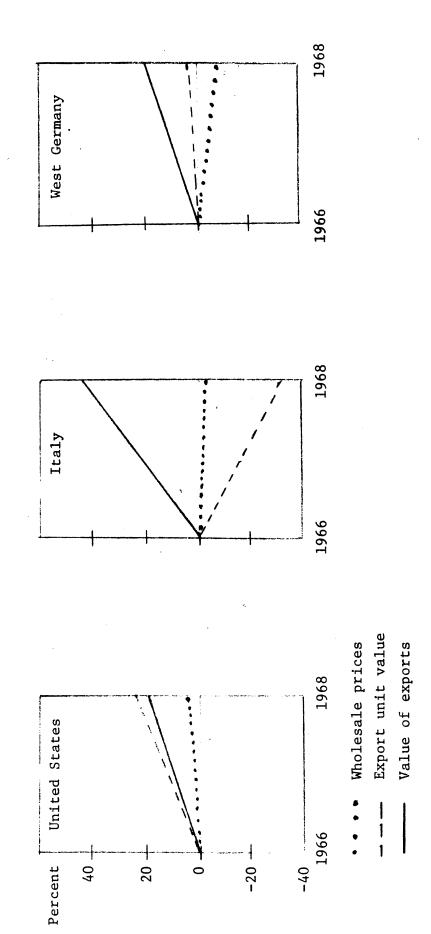


Figure 8.--Percentage changes in wholesale prices, export unit values, and exports of electrical machinery, 1966 to 1968



Imports and price competitiveness

In addition to income, price is generally an important factor influencing the level of a country's imports. While other considerations may also be important (quality and style, for example), foreign merchandise that is priced more cheaply than the domestic product clearly has a significant competitive advantage.

To evaluate the influence of price competitiveness on U.S. imports of manufactured goods, statistical analyses were made for major U.S. suppliers: Japan, West Germany, United Kingdom, France, Italy, and Belgium. These countries together provided nearly half of U.S. imports of manufactured products in 1969. The analyses related U.S. imports of manufactured goods to a price ratio (the foreign index of average export unit value divided by the U.S. wholesale price index for manufactures) and U.S. real gross national product. The dollar value of imports was "deflated" to remove price level effects and thus to obtain a dollar value of imports ("real" imports) that would approximate changes in the physical volume. Since the period generally considered in this report, 1960-69, was deemed too short a period to obtain meaningful results, data for the period 1955-69 were used in the analyses.

While statistical results showed that GNP was more influential than relative price in affecting changes in the level of imports, they did show that for nearly all the countries examined relative price also exerted a significant influence. (Results of the analyses are shown in detail on page 78 of the appendix.) The analyses showed that for each 1 point change in relative price (i.e., the ratio between the

foreign export unit value index and the U.S. wholesale price index), holding real GNP constant, annual U.S. real imports of manufactured goods changed in the opposite direction by the following amounts:

Country	Million dollars
West Germany	43
United Kingdom	12
Italy	6
Belgium	8
France	11

To illustrate: if the West German-United States price ratio (as defined above) increased by 1 point, U.S. real GNP remaining unchanged, U.S. imports of manufactured goods from that country would be expected to decline by about \$43 million a year; if the increase were 2 points, the indicated decline would be about \$86 million. Conversely, if the price ratio were to fall by 1 point, U.S. real GNP remaining unchanged, U.S. imports of manufactured goods from West Germany would be expected to increase by \$43 million a year; if the price ratio were to drop 2 points, the expected increase in imports from West Germany would be \$86 million.

Satisfactory results were not obtained from the analysis of imports of manufactures from Japan. Statistical results did not show a meaningful effect of relative price on changes in the level of U.S. imports from that country. The data indicated that imports from Japan continued to gain appreciably in some years despite an increase or no change in the ratio between the Japanese export unit value index and the U.S. wholesale price index. Between 1966 and 1969, for example, U.S. imports of manufactures from Japan increased by nearly \$1-1/2

billion on a deflated basis even though there was little or no change in the relative price. It may be that even though the <u>relative</u> price rose or remained about the same, on an <u>absolute</u> basis Japanese prices were below U.S. prices. The failure to obtain a meaningful statistical measure of the effect of price may also reflect the intensive efforts—both governmental and private—of the Japanese to promote their exports. This may explain in part the continued strong uptrend in imports from Japan in recent years in the face of little or no change in relative price.

Responsiveness of imports to changes in income

Of factors affecting the size of a country's imports, the level of gross national product is among the most important. For many years, growth in U.S. imports generally paralleled growth in the GNP, and between 1955 and 1965 the ratio of imports to GNP was comparatively stable at about 3 percent. After 1965, however, the ratio of imports to GNP increased, reaching 3.8 percent in 1968 and nearly 3.9 percent in 1969. Even when adjustment is made for imports of automotive vehicles and parts from Canada under the U.S.-Canadian auto products trade agreement, the ratio of imports to GNP was 3.4 percent in 1968 and 3.5 percent in 1969, higher than in previous years. This growth in imports in excess of the growth in GNP has led some observers to contend that annual GNP growth above a certain percentage, say above 5 percent, results in a disproportionate increase in imports.

The recognition that changes in imports are directly related to the income level in importing countries has prompted statistical studies aimed at measuring the responsiveness of import demand to changes in income, among other factors. Findings of a recent study 1/ imply that U.S. demand for imports may be more responsive to changes in its real GNP, when compared with the responsiveness in other countries' demand for U.S. exports to changes in their GNP. For the United States, it was found that for each 1 percent increase in real GNP, relative prices

^{1/} H.S. Houthakker and Stephan P. Magee, "Income and Price Elasticities in World Trade," Review of Economics and Statistics, May 1969, pp. 111-120. "Other countries" in the export equations represented 26 country markets.

held constant, demand for imports increased 1.55 percent, a more than proportionate increase. On the other hand, it was found that when foreign countries' GNP increased by 1 percent (relative prices held constant), their demand for U.S. exports increased 0.99 percent, or by virtually the same percentage. These results suggest that assuming the same percentage increases in GNP in the United States and the foreign countries considered (and no change in relative prices), the resulting proportionate increase in U.S. imports would be 1-1/2 times the increase in its exports. The disparity between these demand elasticities—an import income elasticity of demand 1-1/2 times the export elasticity—may suggest a further reason for the more rapid rate of increase in U.S. imports compared with that of U.S. exports in recent years.

It is significant that opposite findings were reported in the same study for Japan. For that country, it was found that for each 1 percent increase in its GNP, relative prices remaining unchanged, import demand rose 1.23 percent. However, for each 1 percent increase in other countries' GNP (relative prices remaining constant), their demand for Japan's exports increased 3.55 percent. These estimates imply that with an equal percentage change in GNP in Japan and the other countries, the increase in Japan's exports would be greater than the increase in its imports. Between 1960 and 1969, Japan's exports increased at an average annual rate of 16.5 percent, compared with an average rate of increase of 14.4 percent in its imports. Of its 1969 exports, about 31 percent were directed to the United States.

The study also found, based on the available data, that U.S. demand for imported finished manufactures was highly responsive to changes in income, in contrast to the demand of other countries for United States finished manufactures.

STATISTICAL SOURCES

United States:

1. Wholesale Prices and Price Indexes

Belgium:

2. Bulletin de Statistique

3. Annuaire Statistique de la Belgique

Canada:

4. Prices and Price Indexes

France:

5. Annuaire Statistique de la France

W. Germany:

6. Statistisches Jahrbuch für die Bundesrepublik Deutschland

Italy:

7. Review of Economic Conditions in Italy, Banco di Roma

8. Annual Statistical Bulletin, 1969 - American Embassy, Rome

9. Statistica Mensile del Commercio con l'Estero

Japan:

10. Economic Statistics

ll. Japan Statistical Yearbook

Netherlands:

12. Jaarcijfers voor Nederland

Sweden:

13. Statistisk Arsbok för Sverige

Switzerland:

14. Annuaire Statistique de la Suisse

United Kingdom:

15. Monthly Digest of Statistics

APPENDIX

1. Analyses of factors affecting U.S. imports of manufactures from selected countries.

2. Tables showing U.S. imports during 1965-69 from the following countries:

Belgium

Canada

France West Germany

Italy Hong Kong Japan

Republic of Korea

Netherlands

Sweden

Switzerland

Taiwan

United Kingdom

3. Tables showing exports of the following SITC categories from the United States and 10 competitor countries during 1960-69:

> Textiles Nonelectrical machinery Electrical machinery Chemicals Base metals Transport equipment "Other manufactures"

Analyses of factors affecting U.S. imports of manufactures from selected countries

Least-squares regression analyses of the form $y=a+b_1X_1+b_2X_2+u$ were made, in which the variables were as follows:

- Y= U.S. imports of manufactured products (SITC 5-8), deflated by the U.S. Department of Commerce index of unit value of finished manufactures imports (adjusted), 1958=100, in millions of dollars.
- X₁ = relative price calculated by dividing the foreign average export unit value of manufactures by the U.S. wholesale price index of manufactures, 1958 = 100.
- $X_2 = U.S.$ gross national product, in billions of 1958 dollars.

Data for the period 1955-69 were used, and analyses were made of imports from the following countries: Japan, West Germany, United Kingdom, Italy, Belgium, and France. Results of satisfactory analyses are shown in appendix table 1.

The analysis of U.S. imports of manufactures from Japan yielded a positive coefficient on relative price, and for this reason the results are not included in the table. Another analysis for Japan was made in which the dependent variable was all merchandise imports from Japan (rather than just manufactures), and the index of average export unit value entering the price ratio was for all exports from Japan, as calculated by the Japanese Ministry of Finance. However, this analysis also yielded a coefficient on the price variable that was of the wrong sign. This result was not altogether unexpected, since both U.S. imports from Japan and Japanese exports consist predominantly of manufactured goods.

Appendix table 1.--Results of regression analyses of factors affecting U.S. imports of manufactures from selected countries

Country	Constant :	Regression ficient (to in parent Relative: price:	t-ratio :	R 2	Standard error of estimate
West Germany	2,474.31	-43.37 (-5.87):	5.36 : (22.55):		92.83
United Kingdom	413.83	-11.99 (-1.70)	3.03 (9.43)		105.03
Italy	53.02	-5.50 (-1.80)			65.18
Belgium	847.90	-8.31 (-2.33)			38.02
France	886.97	: -11.01 : (-5.19)			31.85

See text for description of variables.

Appendix table 2.--United States general imports from Belgium, 1965-69

(Value in millions of dollars)

(Value in millions	of dolla	ars)	***************************************		
Commodity	1965	1966	1967	1968	ļ
Total imports:	494	568	584	767 :	
Agricultural:	11	21	23	14	
Nonagricultural:	483	547	561	753	
Manufactured goods:	458	512	522	691	
Chemicals:	15	20	16	22	
Textile yarn, fabrics, made-up : articles and related products:	32	35	31	39	
Normetallic mineral manufactures, : n.e.s: Diamonds, except industrialnot :	102	125	125	155	
set or strung: Iron and steel products:	82 156	•			
Bars, rods, angles, shapes, sec- :		:		:	•
tions and sheet piling: Nonferrous metals and articles:	109 3 1	•			
Machinery, other than electric:	24		-		
Electrical machinery, apparatus and :	4	• 41	+5	53 :	
appliances:	3	4	3 :	5 :	
Transport equipment:	11	: 8:	11 :		
Passenger cars, new, and buses:	.9	: 7:	10 :		
Other manufactured goods:	84	: 88 :	88 :	: 100 :	
		: :		:	

Appendix table 3.--United States general imports from Canada, 1965-69

(Value in millions of dollars) 1968 1969 1967 1965 1966 Commodity Total imports----------: 4,858 : 6,152 : 7,140 : 9,005 : 10,384 Agricultural----: 240 226: 244 234: 201: Nonagricultural-----: 4,624: 5,912: 6,939: 8,779: 10,140 Manufactured goods-----: 2,460: 3,517: 4,408: 5,783: Chemicals----: 265: 288 : 308 223: 254: 873: 874: 967 Paper, paperboard and articles----: 792: 893: Newsprint----: 829 : 904 762: 859: 833: Textile yarn, fabrics, made-up 18 22: 19: 21: 17: articles and related products----: 147 Iron and steel products----: 104: 102: 192: 91: 140: 184: 182 163: 180: Nickel, unwrought----: 218: 192 Aluminum, unwrought----: 146: 168: 161: 534 : 615: 699 : 820 Machinery, other than electric----: 354 : Agricultural machinery and imple- : ments----: 221: 240: 201: 219 171: Electrical machinery, apparatus and : 136: 167: 234 : 269 appliances----: 92: Transport equipment----: 797: 1,483: 2,353: 3,107 237: 1,827 Passenger cars, new----: .817 : 1,349 : 77: 371: 549 Trucks, including chassis----: 17: 139: 235: 377: 434 147: Automotive parts----: 210: 355 : 56 : Metal manufactures, n.e.s----: 40: **78**: 116: 135 56: 244: 248: 199 270: 257: Other manufactured goods----:

Appendix table 4.--United States general imports from France, 1965-69

(Value in millions of dollars)

(Value in million:	oi dor	lars)			
Commodity	1965	1966	1.967	1968	1969
Total imports	615	69 8	690	842	842
Agricultural	68	72	81	86	90
Nonagricultural	547	626	610	756	752
Manufactured goods	473	551	528	671	656
Chemicals	54	61	5 9	66	63
Textile yarn, fabrics, made-up articles and related products Iron and steel	24 87		_		28 120
Bars, rods, angles, shapes, sections and sheet piling Machinery, other than electric			•		
Electrical machinery, apparatus and appliances Transport equipment	: 15 : 37	: 74	: 58	: 71	: 59
Passenger cars, new Other manufactured goods					

Appendix table 5.--United States general imports from West Germany, 1965-69

(Value in millions of dollars) 1968: 1965 1966 1967 Commodity Total imports----: 1,341: 1,796: 1,956: 2,721: 2,603 Agricultural----: 41: 41: 56 52 41: Nonagricultural----: 1,301: 1,755: 1,914: 2,666: 2,551 Manufactured goods----: 1,222: 1,655: 1,803: 2,537: 2,438 175 Chemicals----: 127: 126: 169: 89: Textile yarn, fabrics, made-up 44: 56 28: 30: articles and related products-----: Nonmetallic mineral manufactures, 44 : n.e.s----: 36: 32: 26: 212 Iron and steel products----: 185 : 306: 124: 120: Bars, rods, angles, shapes, sec-56 73: 40: 35: 57: tions and sheet piling----: 115 Plates and sheets----: 58: 95: 184: 58: Machinery, other than electric----: 442: 478 356: 228 : 308: Electrical machinery, apparatus and : 92: 100 appliances----: 68: 76: 48: 943 Transport equipment----: 987: 434 : 645 : 632 : 580: 904: Passenger cars, new----: 388: 592: Professional, scientific and control-: ling instruments, photo, optical, 110 72: 92: 73: 63: watches and clocks----: Other manufactured goods----: 361: 313 254: 290: 191:

Appendix table 6.--United States general imports from Italy, 1965-69

(Value in millions of dollars) Commodity 1965: 1966: 1967 : 1968 : 1969 Total imports-----620: 743: 856:1,102: 1,204 Agricultural----: 71: 75: 81: 83: 78 Nonagricultural----: 549: 668: 774:1,019: 1,126 Manufactured goods----: 516: 617: 705: 917: 1,016 Chemicals----: 19: 31 : 30: 33: 38 Textile yarn, fabrics, made-up articles and related products---: 52 48: 45: • 71: 62 Machinery other than electric----: 60: 92: 150: 136 : 152 Electrical machinery, apparatus and appliances----: 12: 19: 26: 31: 53 Transport equipment----: 47: 30: 41: 83 71: Passenger cars, new----: 14: 18: 24: 65 50: Clothing----: 101: 102: 127: 103: 128 Footwear----: 55 : 75: 104: 158 : 199 Iron and steel mill products----: 30 ; 27: 24: 41: 33 Metal manufactures----: 24: 23: 27: 29: 31 Other manufactured goods----: 133: 159: 163: 206 : 237

Appendix table 7.--United States imports from Hong Kong, 1965-69

(Value in millions of dollars)

(Value in millio	ons of do	ollars)		-	
Commodity	1965	1966	1967	1968	1969
Total imports	343.4	415.9	497.6	637.0	814.8
Agricultural	2.5	2.3	2.6	2.8	3.3
Nonagricultural	340.9	409.3	495.0	634.2	811.5
Manufactured goods	308.0	348.9	453.6	579•5	740.1
Chemicals	0.3	0.4	0.5	0.6	0.8
Textile yarn, fabrics, made-up articles and related products Machinery other than electric			38.9 1.1		
Electrical machinery, apparatus and appliances Telecommunications apparatus	33.4	66.4	71.6	92.1	129.5
and partsTransport equipment	17.9 3.2		_	-	
Travel goods, handbags, and other personal goodsClothing and accessories, except	18.0	15.0	22.1	26,2	28.5
fur	114.7 20.9		: 146.7 : 31.9		
Toys, games, sporting goods Rubber and plastic manufactures, n.e.s Jewelry and related articles	9.0	: 12.5	15.5 9.7	36. 6	• 65.9
Other manufactured goods			112.0		
			_	_	_

Imports are general imports except for agricultural, which are imports for consumption.

Source: Official statistics of the $U_{\bullet}S_{\bullet}$ Department of Commerce and $U_{\bullet}S_{\bullet}$ Department of Agriculture.

Appendix table 8 .--United States general imports from Japan, 1965-69

(Value in millions of dollars)													
Commodity	1965	1966	1967	1968	1969								
Total imports:	2,414	: 2 , 963 :	2 , 999	4,054	4,888								
: Agricultural::		:	:	:	: : 37								
: Nonagricultural:	2,377	: 2,926	: 2 , 967	: 4,017	: 4,851								
Manufactured goods	2,220	: : 2,733	2 ,79 7	: : 3,805	: 4,648								
Chemicals	46	: 72	70	: 91	: 121								
Textiles, excluding fibers and apparel Iron and steel mill products Plates and sheets	484	: 531	: 530	: 811	: 764								
Bars, rods, shapes and pilings Machinery, nonelectrical	116		-										
Machinery, apparatus, and appliances, electric Telecommunications	321												
TV receivers	60 84	: 107 : 98	: 118 : 117	: 184 : 176	252238								
Transport equipment Passenger cars, new Motorcycles	25	: 56	: 73	: 194	: 301								
Clothing and accessories Footwear	: 141	: 169	: 160	: 191	: 255								
Sound recorders, reproducers, and accessories Other manufactured goods	: 59			•	• •								
•	•	•	•	•	•								

Appendix table 9.--United States imports from the Republic of Korea, 1965-69

(Value in millio	ns of do	llars)			
Commodity	1965	1966	1967	1968	1969
Total imports	5 3 •9	85.4	: 117.1	: 198.6	291.1
Agricultural	6.9	10.0	8. 9	8.1	7.9
Nonagricultural	47.0	75.4	108.2	: : 190.5	283.2
Manufactured goods	41.7	69.4	104.6	186.3	276.4
Chemicals			•	0.1 5 3.6	
articles and related products: Machinery, other than electric: Electrical machinery, apparatus	6.6 <u>1</u> /	8.0 <u>1</u> /	9.9 0.1		
and appliances Transport equipment Clothing and accessories, except	0 . 6 <u>1</u> /	2.0 0.1	0.0	11.0 <u>1</u> /	25.4 0.1
fur Footwear Other manufactured goods	10.8 3.7 4.7	4.8	7.0	10.0	8.3
1/ Tegg +han \$50,000					

1/ Less than \$50,000.

Imports are general imports except for agricultural, which are imports for consumption.

Source: Official statistics of the U.S. Department of Commerce and the U.S. Department of Agriculture.

Appendix table 10. -- United States general imports from the Netherlands, 1965-69

(Value in millions of dollars)

Commodity	1965	1966	1967	1968	1969
Total imports	251	: 320	368	453	466
Agricultural	79	• 97	105	124	: 128
Nonagricultural	172	223	263	3 29	: 338
Manufactured goods	148	191	228	272	: 269
Chemicals Textile yarn, fabrics, made-up	24	: 29	30	41	: : 37
articles and related products		: 16	10	12	: 14
Iron and steel products			: 18	- ,	: 39
Plates and sheets			: 14	: 33	: 35
Machinery, other than electric					
Office machines and parts	: 14	: 18	: 19	22	: 20
Electrical machinery, apparatus	:	•	:	•	:
and appliances			: 57	•	
Transport equipment		: 2	: 3	: 4	: 8
Other manufactured goods	• 47 •	: 64	: 80	: 87	: 82

Appendix table 11. -- United States imports from Sweden, 1965-69

(Value in millions of dollars)

Commodity	1965	1966	1967	1968	1969
Total imports	243	: 300 :	330	390	355
Agricultural	3	4	3	: 4	. 5
Nonagricultural	240	296	327	386	350
Manufactured goods	193	248	287	350	323
Chemicals	45 44 42 1 35	23 53 60 54	67 79 74 1	75 101 92 2 51	27 78 85 77 2

Imports are general imports except for agricultural, which are imports for consumption.

Source: Official statistics of the Department of Commerce and the U.S. Department of Agriculture.

Appendix table 12.--United States imports from Switzerland, 1965-69

(Value in millions of dollars)													
Commodity	1965	1966	1967	1968	1969								
Total imports	306	388	383	43 8	452								
Agricultural	12	17	15	20	20								
Nonagricultural	294	371	368	418	432								
Manufactured goods	264	337	. 330 :	373	386								
Electrical machinery, apparatus and appliances	50 9 17 n.a. 1 37 12	71 16 26 25 1 43 14 14	83 16 32 30 1 37 14 100	94 17 37 35 2 48 14	90 14 35 32 2 53 16								
outer manaracoured goods	. 17	:	:	:	•								

Imports are general imports except for agricultural, which are imports for consumption.

Source: Official statistics of the U.S. Department of Commerce and the U.S. Department of Agriculture.

Appendix table 13 .-- United States imports from Taiwan, 1965-69

(Value in millions of dollars) 1968 1965 1966 1967 1969 Commodity 387.8 93.2:116.9:165.8:270.0: 32.5: 32.0: 40.9: 42.3 Agricultural----Nonagricultural----: 84.9: 124.9: 345.5 60.7: 79.1: 115.8: 217.1: 332.6 Manufactured goods----: 58.3: 4.8 3.6: 3**.**3: 1.8: 2.7: Chemicals-----47.9 22.1: 39.3: Wood and cork manufactures, n.e.s --: 19.6: 23.1: Wood veneers, plywood boards, improved or reconstructed 40.8 21.8: 19.8: and other n.e.s----: 19.0: Textile yarn, fabrics, made-up articles and related products --: 7.9: 9.6 0.1: 2.0: **3.**9 Machinery, other than electric---: Electrical machinery, apparatus: 58.0: 92.7 13.2: 27.0: and appliances----: Telecommunication apparatus 63.8 3.8: 10.8: 18.5: 39.7: and parts----: 3.2 Transport equipment----: 0.1: 0.1: 0.5: 1.0: Clothing and accessories, except: 25.8: 88.2 11.4: 14.9: 50.4: Footwear----: 15.5: 21.8 3.9: 7.7: 1.5: 22.8: 60.5 39.5: Other manufactured goods----: 12.7: 9.9:

Imports are general imports except for agricultural, which are imports for consumption.

Source: Official statistics of the U.S. Department of Commerce and the U.S. Department of Agriculture.

^{1/} Less than \$50,000.

Appendix table 14.--United States general imports from the United Kingdom, 1965-69

(Value in millions of dollars) Commodity 1965 1966 1967 1968 1969 Total imports-----: 1,405 : 1,786 : 1,711 : 2,058 : 2,121 Agricultural----: 30: 28 32 35 Nonagricultural-----: 1,381: 1,756: 1,683: 2,026: 2,086 Manufactured goods-----: 1,071: 1,397: 1,309: 1,574: 1,662 Chemicals----: 54: 72: 70: 83: Textile yarn, fabrics, made-up articles and related products----: 59: 50: 57: 53 Diamonds excluding industrial, not set; strung----: 123: 114: 133: 155: 187 Iron and steel products----: 87: 87: 94: 141: 115 Bars, rods, angles, shapes, sections and sheet piling----: 21: 48: 44 22: 30: Plates and sheets----: 44: 47: 47: 41 Platinum group metals, unwrought or : partly worked----: 27: 45 : 41: 70: 54 Machinery other than electric----: 210: 294: 301: 319 : 377 Internal combustion engines, other : than for aircraft----: 70: 109 Electrical machinery, apparatus and : appliances----: 64: 40: 72: 71: 78 Transport equipment----: 190: 289: 241: 192: 272 Passenger cars, new----: 90: 114: 103: 125: 137 Metal manufactures----: 35 : 37: 39: 45: 49 Other manufactured goods----: 250: 321: 323: 392: 358

. Appendix table 15.--Exports of textiles (SITC 65), specified countries, 1960-69

Total,	countries listed		4.465	1,505	7004	1, 000	4,970	5,595	5,849	6.216	6,087	6,03	4.00	8,031			100.0	0,001	000	0.001	2001	100.0	100.0	5	36	0.0T	100.0	100.0				•	
••	Switzer couland		189	001	176	199	5 02	225:	234:	• 81/0		100	၁၃၃	324 :			1.0 .			น	٠. د د د	10.4	-	• •	 O.#	4.1	. T. 1	4.0					
	Sweden :	-	25 •) c	. 1 0	• (() (47	: 64	·	3.5	J F	: T.	: ₩	 8			90		ρ	ထ္	φ,		• •	·•	1.0.	1.2		1 -	1				
•	Nether- lands			* *	306 306	354:	356:	118	יייייייייייייייייייייייייייייייייייייי	101	482	1 28 1	557 :					ດ ດ	. 6.0	6.9		, , ,	(.)	. 6.2	7.8	0.4	- 0	000	ς. Ω.	•			
•	Italy:	(04,	` '	• Off	 84 	513:	7,77	500		030	: 099	627 :	785	877		r.	١		•			••	••	•		2	•	••	••	••			
	France	• ריים ייי פּיי	- 1	557	567	798		100	503	: 717	720	705	192	700	120	t of total	;				••	••	••	. •	•	••	••	•	10.3				
	Canada	- 1	Value (million	32	8	, 6	2 -	77		<u>.</u>	55		K U		T).	Percent		C	•	••	••	••		•	••	••	••	•	0		-		
	Belgium		a A	385	, ,	071	4 0	208	568	591	759			714	850			7 g		7.6	6,6	10.3	0	5 6	T•0T	10.6	10.2	10.3	, C	C• CT			
	United	wagarw.		731	- d		• 929 929	711 :	777	27.	200		• 86	717 :	833:				TO.4	15.3	9.41	۶ ار	ה ה ה ה ה		13.1	11.7	٤, [[) -	†	1.0°4			
		Germany	•	900	597	415	• †††	530 :	, ec.	777		. Q.J.	832	1,001	1,261			*	χ. Ω	9.5	• 10		· • • • • • • • • • • • • • • • • • • •	11.0	11.4:	12.5:		7-	14.5	15.7 :		table 21.	
1	Tapan :	•			3 54	877 :	937 :	915		L,000	1,139:	1,271	1,229	1,435	ָּרָלְיָלָ הַלְּהָ	- 750T			20.7	_							<u>.</u>	Š.	••	202	••	appendix	
	United	States			493	264	non.	5	1,47	. 282 	528	554 :	53]	1001	755	2/0	••	••	0.[[0 0 0	101	. IC.4	6.6	10.4				••	••	7.2		Spe	2
	. reeV	•	••	••	1960:	1961	10/2	17001	1903	1964	1965	1996	1067-	1067	1,000	1969-1			1060-	200	TO/T	1962	1963	100L	- 190	1,000	1906	1967	1968	96	1	l Con	nog

Appendix table 16.--Exports of machinery other than electrical (SITC 71), specified countries, 1950-59

: Total, : countries : listed		••	10,203	: 11,780	12,904	: 13,646	: 15,289	16,894	: 19,421	20,930	23,085	: 26 , 740	•		••	100.0	100.0	100.0	10000	1000	100.0	100.0	100.0	0.001	100.0	••	
Switzer- land			121	777	528	566	603	1 99	736	785	488 887	1,046				7.											
Sweden		••	353	437	515	513	577	625 :	753 :	. 687	861 :	* †96		٠	••	3.57	3.7	•	•	•	•	•	•	•	•	••	
Nether- lands		••	506	237	285	288	331	387	1457	509	561	673	••		••	2.0	0.0	2.5	2.1	2.2		ት . ሪ	ት · ሪ	4. 8	2.5	••	
Italy	dollars)	•••	: 516 :	: 613 :	902 :	: 793 :	. 498 .	: 1,038:	1,287 :	: 1,516:	: 1,731 :	: 2,014:	••		••	5.1:	5.2:	5.5:	5.8:	: 5.7 :	• 6 _• 1 •	: 9.9 :	: 7.2 :	. 7.5 :	: 7.5:	••	
() 1	(million do	••	: 563	: 650	: 760	812	. 911	1,064	1,234	1,407	1,592	1,894	••	of total	••	5.5	5.5	5.9	•9	0.9	. 6.3	† •9	. 6.7	6.9	. 7.1	••	
: Canad	Value (n	••	••	••	••	••	. 436	••	••	••	••	٠,	••	Percent o	••	2.6	2.3									••	
Belgium			1,90	5710	: 288	300	376	: 423	0111	154	\$ 515	: 643	••		••	1.9	2.0	2.2	2.2	2.5	2.5	2.3	2.2	2.2	₽. 2 .	••	
United Kingdom		••	1,993	2,172	2,259	7,404	2,403	2,606	2,914	2,856	3,045	3,402		·		19.5	18.4	•	•	15.7	•			•			
West Germany			2,255	2,833	3,077	3,299	3,588	3,933	4,564	4,952	5,498	6,302				•	24.1			•	23.3	23.4		-	23.6		40470 01
Japan :		••	: 221 :	313:	335 :	339 :	: 481 :	: 624 :	813:	928	: 1,167 :	: 1,539 :	••		••	•	. 2.7	•	•	•	•		: n°t :	•	5.8	••	
United States		••	3,219	3,537	3,846	3,989	4,719	5,044	5,547	5,951	6,320	7,188	••	••••		31.4	30.1	29.8	29.5	30.8	29.9	28.5	28.5	27.5	26.9	••	100
Year		•	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969				1960	1961	1962	1963	1961	1965	1966	1967	1968	1969-		

Appendix table 17.--Exports of electrical machinery (SITC 72), specified countries, 1960-69

Year	United States	Japan	West Germany	United Kingdom	Belgium :	Cenada :	France	Italy Ne	Nether- lands	Sweden :	Switzer- land	Total, countries listed
Constitution of the consti	nen entre de la compressión de	de filoso capanado seguino de la compansión de la compans				Value (million	lion dollars	ars)				
•	•	Li ANNO DESCRIPTION DE LA CONTRACTOR DE		nce-tereurherrichen Court Gusterbestration		••	59	0	96	04	•C	
1060-	1.071	274	842	655	777	** 64	263:	101:	348:	TOT	124:	0,50° m.
1.00	000	756	200	2092	132	78 :	319:	167 :	346 :	. 121 .	143 :	4,634
10/0	. Jahr .	20 20 20 21 21	1,085	804	129	 8	348 :	500	363 :	143 :	150 :	5, 121
1000	• C-(-: -		, 400 L	801	182	102	 2007	262 :	1460	1,66	1.66	5,763
	・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・	7000	15.4.C	000	760	118	644	343 :	578 :	219:	181	200,9
・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・	・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・	0000	27.7	000	0.00	0.0	535	1430	623 :	भटट	272	7,336
1,700.	μος - Ε	- C C C C C C C C C C C C C C C C C C C	7,7	270	1 0 7 n	27.3	7 L 7 L 7 L	16t	623	564 :	229	8,237
LYCC LYCL	1,077 0,007 0,007	ナックノン。ナーフログロー	17017	000	0.00		165 191	5.94	663 :	283	249	8,917
2007 2007 1007 1007 1007 1007 1007 1007		י בטת הטת	1000	700	100	386	929		733 :	329	304 3	10,154
1070	1, 000 1,000	43/64 400 600	404.0	0.1.	353	427	832 :	838 838	876	378	355 :	12,254
•		1)		80	••		67	0 5	20 ag. l. Hagel is supplement a limit to evidence have
a` ∌ ⊕ €	C)	Market and the state of the sta			Andrea de Antonios describir de Antonios de Antonios de Antonios de Antonios de Antonios de Antonios de Antonio	Percent	t of total	Ţ			-	074404-4-3-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-
•	•)					•	••	•	•0	66	
10901	. 1 40	9	6, 6	16.5	5.0	7.9	9,9	5.6	8°8	200	3.1.	100.
1.061	1000	700	22.1	791	ω α	1.7 :	. 6.9	3.6:	7.5 :	 9.0	ქ	000
1060	0.00	α.	0.10	15.7	3.1	1.8:	6. 8	4.1	7.1:	2° &	2.0	0.001
1063	000 1 - 00	σ α	700	7.5	0	1.8	6.8	4.5	• ဝ ထ	2.9	2.9	100.0
1997	25.	6	19.9	13,3	w V	1.8 :	6.8	5.2 :	8.7 :	 	2.7 :	
1965-	22.6	10.6	20.1	12.6	 	2.9:	7.3.	5.9:	8 	 	, o	
1966-	23.0	72.21	19.7	8.11.8	3.1	3,3 :	 8.9	• 0 • 9 • 0 • 9	7.6	ν ο	יי מיס	8 5
1967	23.5	13.0	19.7	10.7	2.9	3.5:	9.9	6.7 :	* † · <u>/</u>	on o	ָ ט ט ט ט	800
1968	22.4	15.0	19.5	7.6	2.9	 დ ო	6.7 •	. 6.9	7.2	יי איי איי	 	8 6
1969-	21.9	16,3	19.6	1.6	2.9	3.5 :	6.8	8.9	7.1:		N V	200
				••	••	••	••	••	••	••	•	
Bource	See	appendix	table 21.							-		

Appendix table 18.--Exports of chemicals (SITC 5), specified countries, 1950-69

		ն	3.3.							•		7. C+3.
Year	United States	Japan	West Germany	United Kingdom	Belgium	Canada :	France	Italy [Nether-	Sweden	Switzer- land	1 4 0
				The same property distributions distributions and the same same same same same same same sam	Λ	Value (million	lion dollars	rs)				en agrander ver en de distribution de la constitución de la constituci
• • • • •	A de le les con le commente en enflecte se la		AND THE PERSON OF THE PERSON O		•	-	•	•	••	••	••	
1060	01/2	169.	1,260	886	253	189	593 :	: 292	337 :	75 :	364	6,137
	7177	000	, (%)	017	* 6t/2	183 :	633 :	323 :	377 :	80	387 :	464,9
1961	7/0	ν τ γ σ	т. П.С.	040	10 してい いい	100	555	360 :	407	: 68	416:	6,913
1962	1,855 -	707	これ しょうしょう	2000 F	agc	0.0	・・ハンハン・・・ハンハン・・・・ハンハン・・・・ハンハン・ハン・ハン・ハン・ハ	387	* 844	103	: 99 [†] 1	7,501
1963:	1,943	31.5	1,040	1,050 t		100 とより		007	536 :	124:	526:	8,925
1994	2,375	707	1,00°L	. +7T, T		3 6		, y	* '	130	585	9,937
1965:	2,402	: 242 :	2,077	1,230:	3. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	. 177	1014 .	100		יי קלי		702,11
1966	2,676	: 699 :	2,414	: 1,313:	. 422	346	+, 1, 4 +, 1, 4		(03	101	200	700,01
1967	2,803	: 687	2,705	1,360:	: 1.2.47	372:	1,244:	581		: Z)T	. 50)	120,04 10,04
1000	2000	805	3,114	1.438	989	108	1,361 :	780:	1,108:	197 :	: 712 712	13,51
1000	2000 2000 2000 2000	910-1	3,500	1,0,1	809	1,56 :	1,589:	820:	•	235:	: 986	458,41
•)))		, , , ,	•••	•••	••	••	••	••	••	••	
• • •						Percent	of total					
••					8	•		•	••	••	••	
•	(C (· ·	 	· ·	9.7		5.5 :	1.2:	•	100.0
1990:	2α.	, v	KO. 1	7. T.	10	ια • • •			ν ις ν ας	2,5	ŧ	100.0
1961:	27.4	2.9.	21.3	. T. +T) n		- L			۲,		100.0
1962	27.0	 დ ლ	20.9	13.9:	က်	. V. V	ر د د	•	, u) _== 	•	100.0
1963:	25.5	: 4.1:	21.7	: 13.6 :	æν m	 0,0	پر	•	7	• • † ∴ • ⊢		100.0
1964	56.6	: 4.3 :	21.1	: 6.21 :	φ κ.	N O	, , , , ,	•	֓ ֓ ֓ ע	-		100.0
1965:	24.1	5.5	20.9	12.4:	0.4	 6.0	2.01	•		• • • -	•	100.0
1966	23.9	. 0.9	21.5	: 11.7 :	χ. Μ	ਦਿੱਲਾਂ :	10°T	•	, , , , , , , , , , , , , , , , , , ,	• • † • -	•	100
1967	23.2	5.7	22.4	: 11.2 :	o. 0	3.1:	10.3 10.3	•	- t	 t .= + r	•	100.0
1968	23.6	5.8	22.3	: 10.3:	9•4	2.9:	. 8.6	, o	 V (0,0	100.00
1969	27.4	4.9	, 22.7	: 10.4:	5.1	2.0	10.01	•	700	· ·	•	
				••			••	••	•			
Source	See	appendix	table 21.	*								

Appendix table 21, -- Exports of other manufactures, specified countries, 1960-69

Total, countries listed		12,286	12,332	13,655	15,145	: 17,122	19,224	51,689	23,028	. 26,07 <i>)</i>	30,857			0.001		0.00T	100.0	100,0	100.0	100.0	0.00				100.0	•	Commodity Trade	
Switzer- land		563	610	672	720	767	905	1,001	1,073	1,66	1,340	25.2		7 1					9 11			0 1	J. 4.	. 4.5	. 4.3		Commo Commo	
Sweden :		1483	525	566:	634 :	720	761	843	8000		26.	- 27 - 6 -			w N		7.	2 1	-	1	0.0	3.9	3.9	φ κ	3.8			
Nether- lands		. 041	182	519 :		711	815	00 00 00 00	. 050		F. C.	15564	i		ထို	3.0	α,	0 0	· ·	4.	N.	7.	4.2	7,4	٤- ग	•		and Development
Italy	rs)	. 336	876	000	1,047		1,415	+, (+)	2000	2000	2,79	3,430			6.1	7.1:					8.9.	9.6	6.6	700	י דר דר יי			Co-operation a
France	lion dollars	0.0	712,1	7,70	700	*	1,073	1,00 c	1,914	1,991	2,209	2,556	+ C+		0.0			: 	3.6	. 9.1	9,1	α,	α	o u		: Q.3		
Canada	Value (million		970,7	200		1,074	1,136	1,190	1,325	1,348	1,487	1,726	40000	rercent or		· ·	••	••	••	••			9 4	••	••	••	••	for Economic
Belgium	A	The second second	969	, , , ,	858	950	1,172	1,283	1,453	1,512	1,722	2,069		4	23	,	٦.°°	6.3	6.3	6.8	7			۵٬	9.9	. 6.7	•	canization
United			1,506:	1,542:	1,599 :	1,706:	1,865:	2,495:	2,687	2,713	3,007	3,616				2.3	12.5	11.7	11.3	0	2	֓֞֞֜֝֜֜֝֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֟֝֓֓֓֓֓֓֓֓֓֟֝֓֓֓֓֡֓֡֓֟֓֓֓֡֓֡֓֡֓֡	12.4	11.8	11.5	11.7		Traile Ora
West .			2,038:	2,113:	2,214	2,515:	2,832	3,089	3,486	3,830	1,338	י גרנט ת ה גרנט	- 6-367		The second secon	16.6	17.1	16.2	746	ש אר	Corr	1.01	16.1	16.7	16.6	17.0	7	L Consoli
Japan :	••		1,168:	1,168:	1,353:	1,473	1,722	2,036	2,382	0,000	, 77, c	1000	35/24			9.5	0,5			· · · · · · · · · · · · · · · · · · ·	. i.or :	10.6	11.0:	11.5:	12.1	,	C•21	
United	e parane		2,386	2,449:	2,599	2,913	3,154	3,191		יייים אַנוֹיייים ייייים אַנוֹיייים ייייים אַנוֹייים ייייים אַנוֹייים ייייים אַנוֹייים ייייים אַנוֹייים ייייים אַנוֹייים ייייים אַנוֹיים ייייים אַנוֹים ייייים אַנוֹים ייייים אַנוֹים יייים אַנוּים יייים אַנוֹים יייים אַנוֹים א	- +C) • C	7076	000	••		19.4	0 01	1000	1.67	1.61	18.4	16.6	16.6	16.3	ָרָע מין מין	0.00	14°N	•
Year		. •	1960	1961	1962	1063-1	100	1065-1	1000	10001		00/1	1969			1060	ייניסנ	1007	1904	1963	1961	1965	1001	1067	250	-2007	1989-	

Source: Statistics of Foreign Trade, Organization For Statistics, Statistical Papers, Series D, United Nations.

COMPETITIVENESS OF U.S. INDUSTRIES

PART II

A STUDY OF THE DETERMINANTS OF THE
TRADE POSITION OF UNITED STATES
MANUFACTURING INDUSTRIES

Introduction

In this portion of the study a number of measures of the competitive position of U.S. industries--and of changes in competitive position -- are compared. In the first section, data are presented by industry showing the shares of domestic shipments accounted for by imports and exports in a base period, 1958-60, and in 1968, and indicating changes from 1958-60 to 1968 in the import and export position of each industry. These measures of levels and changes in trade--as well as other measures, such as ratios of imports to exports and to trade balances--are then compared and evalu-In the next major section of the study, an attempt is made to determine the industry characteristics (such as capital intensity or skilled labor employment) associated with strong or weak competitive positions and with changes in competitive positions over time. this respect, it appears that <u>levels</u> of competitive position, by industry, are not significantly correlated with changes in competitive position; hence the determinants of levels and of changes are examined separately. The remaining two main sections of the study explore two other factors alleged to have had a considerable influence on trade competitiveness in recent years: the spread of multinational business, and the expanding flow of technology across national boundaries.

Data Sources and Coverage

The data for foreign trade and domestic shipments used in the first two portions of this study were tabulated from Census Bureau

tapes by the Trade Relations Council (TRC) and published in the TRC's publication Employment, Output, and Foreign Trade of U.S. Manufacturing Industries, 1958-1968/69 (3rd edition, Washington, 1971). This source yielded 194 data units, basically 4-digit Standard Industrial Classification (SIC) groups. Descriptions of these groups are given in tables 3, 4, and 5. The coverage of the data is comprehensive, including virtually all of U.S. exports and imports of factory goods, and over 95 percent of domestic shipments of manufactures in 1968.

The years chosen for analysis were 1958-60 and 1968. Data for 1958-60 represent an average of the observations for those years, a period in which the U.S. experienced heavy surpluses on trade account, and which preceded by at least half a decade the erosion of trade surpluses which occurred in the second half of the 1960's. Data are not available in the form needed for years later than 1968, while that year was the first in which serious deterioration of the balance of trade became apparent.

Measures of Competitive Position

Measures of "competitive position" may be divided generally into two groups. In one group are gross measures, which consider imports and exports separately in relation to output or the size of the domestic market. Measures of net competitive position, on the other hand, consider the overall effect of trade in both directions. Typical of the net measurements are imports relative to exports or exports less

imports (the trade balance) relative to domestic output. A total of seven gross and net measures are considered here, as follows:

Gross Measures

Imports relative to domestic sales $\underline{1}/$ Imports relative to domestic shipments
Exports relative to domestic sales $\underline{1}/$ Exports relative to domestic shipments

Net Measures

Imports relative to exports

Trade balances (exports less imports)

Trade balances relative to domestic shipments

Correlations among these seven measures of competitive positions for the 194 industries included in the study are presented in table 1, for both 1958-60 and 1968. These correlations suggest the following:

- (1) There is little difference between the two gross measures of import position and similarly between the two gross measures of export position; in the cases of both imports (row 1 vs. column 2) and exports (row 3 vs. column 4), the correlations are positive and very strong, indicating that the alternative measures are about equal in effect.
- (2) The determination of an industry's import position is not a mirror image of the determination of its export position--i.e., the

 $[\]underline{1}/$ "Domestic sales" are defined as factory shipments plus imports less exports.

-	Table 1Correlations between alternative measures of competitive positions of U.S. industries, 1958-60 (average) and 1968	alternat	ive measur	es of co	mpetitive	positions	s of U.S.	industrie	s, 1958-6	0 (averag	te) and 19	890	
					•	Variable number	number						
			2		3		· ·	5	••	9	53	7	
Variable number	Description	Corre- lations for	Corre-:lations:for:1968	Corre- lations for 1958-60	: Corre- :lations : for : 1968	: Corre- :lations : for :1958-60	Corre- :lations : for : 1968	: Corre- : :lations : for :	Corre-: lations: for:	Corre- lations for :	: Corre- :lations : for : 1968	: Corre- : lations : for : 1958-60	: Corre- :lations : for : 1968
-	Imports relative to domestic sales	92	35	05	60.	.07	. 49	. 30	. 33	29	21	87	06
81	: Imports relative to domestic shipments						65.		. 22	22			91
m	Exports relative to domestic sales	•••					76	14 :	15	. 32	22	98.	
4	Exports relative to domestic shipments				• •• •• ••			-,15	17	31	: .19	25	
'n	: Imports relative to exports			. ,	,					22	18	:24 :	35
•	: Trade balance (exports : less imports)		• •• •• ••				· •• •• ••					31	. 30
7	: Trade balance relative to domestic shipments:		• •• ••										

Source: Basic trade, production, and sales data for 194-industries from Trade Relations Council of the United States, Inc., Employment, Output, and Foreign Trade of U.S. Manufacturing Industries, 1958 - 1968/69, 3rd. ed., 1971

relation between factors which make for a strong export position and those producing a weak import position is more complex than simply their presence in the former case and their absence in the latter one. If such simplicity did exist, the correlation between imports relative to domestic sales (row 1), and exports relative to domestic sales (column 3), and between imports relative to domestic shipments (row 2) and exports relative to domestic shipments (column 4) would all be strong and negative. Instead, these correlations generally are weak and in one case (row 2 vs. column 4) rather strongly positive for 1968. They suggest, at best, that different sets of factors determine export position from those which determine import position and, at worst, that factors present in strong export industries may also be present in industries characterized by heavy imports. In any case, the results indicate that it is necessary to study separately the factors associated with large exports and those associated with large imports; the reasons for large imports cannot be inferred from an understanding of the reasons for large exports.

(3) In general, the gross measures of trade performance are not very strongly correlated with the net measures (rows 1-4 vs. columns 5-7). Thus, neither a strong gross export position nor heavy gross imports in any industry is necessarily an indicator of that industry's net trade performance. However, an important exception of this generalization exists in the strong negative relationship between both of the gross measures of import position (rows 1-2) and the trade balances relative to domestic shipments (column 7). The same relation would hold if the

trade balance were related to domestic sales. It means, essentially, that in industries where gross imports are high relative to domestic output or the size of the domestic market, the trade balances for those industries (again, in relation to output/market size) tend to be large and negative. Conversely, industries with small gross imports in relation to output/market size, tend to show large and positive trade balances in relation to output and market size. The fact that a similarly strong relation does not appear for the measures of gross export position (rows 3 and 4) apparently means that a large number of industries in which gross exports are highly competitive in foreign markets either do not export a sizeable proportion of their output or are characterized by imports large enough to produce a lackluster trade balance.

(4) The three measures of net trade position are poorly correlated with each other (rows 5-6 vs. columns 6-7). Among the three, there is no "best" measure of net competitive position; for any given industry, the trading strength shown by the measures of net trade performance can vary considerably, depending on the measure chosen.

Table 2 shows correlations among the seven alternative measures of changes in the competitive positions of U.S. industries that took place between 1958-60 and 1968. These correlations suggest the following:

(1) As with the measures of levels of competitive position, there is essentially no difference between either the two measures of changes in gross import performance or the two measures of changes in gross

Table 2--Correlations Between Alternative Measures of Changes in the Competitive Positions of Industries, 1958-60 (Average) to 1968

		Vai	Variable number	number		
Variable : number :	Description :	2 3	, 7	5	9	7
	Changes in imports relative to domestic sales	1.00 :17 :	14		.05	03
7	Changes in imports relative to domestic shipments:	20	17:	. 82	. 40.	03
m	: Changes in exports relative to domestic sales:	•• ••	. 66.	-,71 :	. 04	80.
4	: Changes in exports relative to domestic shipments:		••	68	. 04 :	60.
Ŋ	: Changes in imports relative to exports:		••	••	.02	, 08 1
9	: Changes in trade balance (exports less imports):		••	•• ••	¢• ••	17.
7	: Changes in trade balance relative to domestic		••	•• ••	••	
	: shipments	••		••		
		The from Tr	from Trade Relations Council	ations (Council	

of the United States, Inc., Employment, Output, and Foreign Trade of U.S. Manufacturing Industries, 1958-1968/69, 3rd ed., 1971. Source: Basic trade, production, and sales data for 194 industries from Trade Relations Counci

export position. Correlations between row 1 and column 2 (on the one hand) and between row 3 and column 4 (on the other), are perfect or nearly so.

- (2) Changes in gross import position (rows 1-2) are negatively correlated with changes in gross export position (columns 3-4), although the correlations are not strong. Thus for many industries there is a tendency--albeit a weak one--for increased import penetration of the domestic market to be accompanied by declining export competitiveness.
- (3) The foregoing conclusion shows up much more strongly in the correlations of changes in both gross import and gross export positions (rows 1-4) with changes in the ratio of imports to exports (column 5). As a measure of net trade position, this ratio is quite sensitive to changes in both gross imports (in the numerator) and gross exports (in the denominator). Rising imports and falling exports raise the ratios rapidly, producing a strong and positive correlation with changes in gross import position and a strong and negative one with changes in gross export performance.
- (4) The other two measures of changes in net trade performance yield inconsequential results. Correlations between them and the other measures of changes in gross and net trade performance (rows 1-5 vs. columns 6-7) all are very low. Hence, the most widely known and popularly discussed measure of changes in competitiveness, the trade balance, turns out to be an unreliable guide to assessing changes in

the competitiveness of particular industries—both when the trade balance is considered in terms of its absolute size and when it is related to domestic output. The low correlations indicate that significant changes in trade balances occurred generally in industries different from those in which there were significant changes in either gross import or gross export position, or in the ratio of imports to exports. Hence, identification of the factors associated with changes in the two trade—balance measurements would not be identification of the factors associated with changes in gross import position, gross export position, or the ratio of imports to exports.

The foregoing comparisons of the various measures of gross and net trade positions, and of changes in them, suggest, on balance, that the best focus for a study of factors affecting trade performance is the gross export or import position of an industry, plus associated changes in gross export or import position over time.

The correlations show that the choice of alternative measures of gross import or gross export position is immaterial; either measure—the one related to sales or the one related to shipments—will serve equally as well as the other. However, because the data obtained from the TRC tabulations express the f.o.b. rather than the c.i.f. value of imports, the calculation of factory shipments plus imports (f.o.b.) less exports (f.a.s.) does not exactly measure total sales in the domestic market. Freight, insurance, and customs duty costs should be,

but are not, included as part of the sales value of imports, Therefore, imports and exports relative to domestic sales perhaps are not as well measured by the series developed for them as are imports and exports relative to shipments by the series developed for them; hence, the remaining analysis in this study will use the latter measures.

Import and Export Positions of U.S. Manufacturing Industries and Changes in Them

Observations of import position, export position, and changes in both are given for all 194 industries in the data set, in tables 3, 4, and 5; the information contained in these tables is summarized in table 6.

Several generalizations regarding the patterns of values can be drawn from the summary statistics in table 6. First, the median is less than the mean for each of the import and export ratio series (rows 1-4); this indicates that the distributions of these series are skewed to the right—i.e., that each series contains several values which are considerably larger than the "general body" of values in that series. This observation seems to hold more strongly for the import series than for the export series; tables 3 and 4 reveal that each of the import and export ratio series contains a few relatively large values, with a fairly sudden drop in each series from a few high values to a long list of values of similar magnitude. This drop is more pronounced for the import series than for the export series.

A striking fact about the relative changes in imports and exports by individual industries is brought out in table 6 (rows 5-6). The

Table 3.--U.S. imports f.o.b. relative to domestic shipments, by industry, 1958-60 (Avg.) and 1968

(Values in percent)

		(Values in percent)		1050	60	-	1968	
SIC/TRC	:	Description	<u> </u>	1958-		:_		Value
Code	:	Description.	:		Value	<u>:</u>	kank :	varue
	:		:	1 .	221.6	-		259.1
3913	:	Lapidary work	•		124.7			129.0
3339	:	Primary Non-ferrous metals, n.e.c	:	3:			7:	46.2
2611	:	Pulp mills	•	4:			9:	36.8
2294	:	Processed textile waste	•		T. ". "		4:	67.2
3262	:	Vitreous china food utensils	:	5 : 6 :			12:	30.8
3962	:	Artificial flowers	:	7			15:	27.9
2061	:	Sugar (Incl. 2062/2063)	:	•			6:	48.4
3751	:	Motorcycles, bicycles, and parts	:	8 :			3:	73.1
3636	•	Sewing machines	•	-			8:	39.2
2429	:	Special product sawmills, n.e.c.	:	10			13 :	29.3
3872B	•	Watch cases	•	11			20:	21.4
2298	:	Cordage and twine	:	12				32.9
20851	. 🕹	Distilled and bottled liquors (inc. 20853)-	•	13			10:	
3031	:	Canned and cured seafoods	•	14				19.8
3263	:	Fine earthenware food utensils	· :	15				48.9
3021	•	Rubber footwear	• :		: 19.4			26.2
2621	:	Paper mills (excl. building paper)	•:	17				18.1
22XX 1/	:	Textile mill products, n.e.c	• •		: 19.1			8.3
2084	•	Wines, brandy, brandy spirits	- :	19	: 17.6			26.4
3871	•	Watches and clocks	-:	20				16.0
3332	:	Primary lead	- 3	21				12.9
3151	:	Leather gloves and mittens	-:	22	: 14.8	:	11:	32.3
3264B	:	Procelain electrical supplies and	:		:	:	:	
32042		nottery products	-:	23	: 12.5	:		
3333	:	Primary zinc	-:	24				
2432		Veneer and plywood	-:	25				
3914	•	Silverware and plated ware	-:	26	: 9.7			
2421B	•	Saw- and mlaning mills	-:	27	: 8.9			
3572		Typovritore	- :	20	: 8.8			
3211B	٠	Flat class	-:	29	: 8.5		: 34	
3334	•	Primary aluminum	-:	30	: 8.1		: 30 :	
2861	•	Gum and wood chemicals	-:	31	: 6.9			
		Wallpaper	-:	32	: 6.9			
2644 2231		Wool weaving and finishing mills	-:	33	: 6.9			
		Ceramic wall and floor tile	-:	34	: 6.8	3	: 22	
3253	•	Buttons	-:	35				9.2
3963		Radio and T.V. receiving sets	_:	36				: 15.3
3651A		Musical instruments and parts	_:	37				: 11.2
3931		Husical instruments and parts	_:	38				: 7.2
3522		rarm machinery and equipment	:-:	39				: 17.1
2094		: Animal and marine fats and oils : Luggage	_:	40	_			: 7.5
3161		Luggage	:	, U	:		:	:
			:	•	•		:	:
		•	•	•	•			

Table 3.--U.S. imports f.o.b. relative to domestic shipments, etc. (cont'd)

SIC/TRC		195	8-60	:	19	68
Code		Rank	: Value	::	Rank :	Value
	:		:	:		
3356	: Nonferrous rolling and drawing mills, n.e.c.:	. 79				2.1
3141B	: Shoes, inc. house slippers:	80	: 2.0	:	51:	8.4
2891	: Adhesives and gelatin:	81	: 2.0	:	102:	2.5
2311	: Miscellaneous apparal, n.e.c. (2311-2389C)-:		: 2.0) :	73 :	5.1
28XX 1/	: Chemicals and allied products, n.e.c	83	: 1.9	:	110:	2.2
2211	: Cotton weaving mills and finishing plants:	84	: 1.9	:	87 :	3.6
3573	: Computing and related machines: Office	;	:	:	:	
	: machines, n.e.c	85	: 1.8	3 :	72 :	5.1
2 8 23B	: Cellulosic manmade and noncellulosic	}	:	:	:	
	: organic fibers; tire cord and fabric	86	: 1.8	3 :	95 :	3.0
2241	: Narrow fabric mills	87	: 1.	7 :	90 :	3.9
2091	: Cottonseed oil mills	88	: 1.	7 :	105 :	2.5
3641	: Electric lamps	89	: 1.	5 :	97 :	2.8
2731	: Book publishing		: 1.	5 :	94 :	3.1
3841	: Surgical and medical instruments		: 1.	5 :	115 :	2.0
3713B	: Truck trailers and bodies; bus bodies;		:	:	:	:
	: motor vehicle parts and acces. (incl.3714	:	: .	:	:	
	: and 3715)		: 1.	5 :	38 :	10.9
3674A	: Semiconductors	93	: 1.	5 :	71	5.1
3671B	: Electron tubes; cathode ray picture tubes	94	: 1.	5 :	85	3.6
3121	: Industrial leather belting and leather	:	:	. ;	;	. .
	: goods, n.e.c	95	: 1.	5 :	41	10.3
23XX 1/	: Miscellaneous apparel and related	:	:	:	:	;
	: products, n.e.c	: 96	: 1.	5 :	175	0.3
2071	: Confectionery products		: 1.	4	: 107	2.4
2032	: Canned specialty foods (inc. canned and		. :	:	;	;
	: frozen fruits and vegetables)	98	: 1.	4	83	3.9
3611	: Electrical measuring instruments		: 1.	3	: 78	4.4
2342	: Corsets and allied garments		: 1.	3	: 108	2.3
3996	: Hard surface floor coverings		: 1.	2	: 127	: 1.6
3554	: Paper industries machinery		: 1.	2	: 66	6.2
32XX 1/	· · · · · · · · · · · · · · · · · · ·	:	:		:	:
	: products, n.e.c	: 103	: 1.	2	: 172	. 0.3
2833B	: Medicinals, botanicals, pharmaceuticals		: 1.	2	: 113	2.3
2121	: Cigars			2	: 157	: 0.9
3991	: Brooms and brushes			1		3.
3553	: Woodworking machinery			1		
3536	: Hoists, cranes, monorails	: 108				
3172	: Personal leather goods	: 109		1		
3692	: Dry and wet primary batteries	: 110		0		: 3.
3624	: Carbon and graphite products	: 111		0		
	: Orahingto kroanen	:	:		:	:
	:	:	:		:	:
_		-	-			

Table 3.--U.S. imports f.o.b. relative to domestic shipments, etc. (cont'd)

SIC/TRC	:	Description	19.	58	-60)	:_	1	96	8
Code	:	Description	Rank	:	٧٤	lue	:	Rank:	V	alue
Code	÷			:			:	:		
3941	:	Games and toys:	41	:		5.2	:	52:		8.3
2093A	:	Vegetable oil mills, n.e.c. (incl. 2096):	42	:		5.2	:	61 :		6.9
3711		Passenger cars and chassis		:			:	:		
		(Partial: item 37111)	43	:		4.9		36 :		11.2
3555	:	Printing trades machinery	44	:	;	4.9		54 :		8.2
3291	•	Abrasive products	4)	:	;	4.8		74 :		4.8
3111	:	Leather tanning and finishing	: 46	:	;	4.8		45 :		9.3
3421	:	Cutlery	4/	:	:	4.7		48		9.0
3552	•	Textile machinery	48	:	:	4.5		19		21.6
3861	:	Photographic equipment and supplies	49	:	•	4.1		79		4.3
3481	:	Fabricated wire products	: 50) :	:	4.0	:	57	:	7.8
2221	:	Synthetic fiber weaving mills and	:		:		:		:	
	:	finishing plants	: 51			3.9		91		3.3
2871	:	Fertilizers	: 52			3.6		125		1.8
3942	:	Do11g	: 53	}	:	3.5				28.0
2283	:	Wool varn mills	: 54	ŀ	:	3.5				4.7
3949	•	Sporting and athletic goods	: 53			3.4				9.6
3171	:	Handbags and purses	: 50	5	:	3.4				16.1
24XX 1/	:	Lumber and wood products, n.e.c.	: 5		: .					2.6
3281	:	Cut stone and stone products	: 50	3	:	3.2				7.6
39XX 1/	:	Miscellaneous manufactures, n.e.c	: 5	•	:	3.1				5.8
2011	:	Meat packing plants	: 60)	:	3.1	:	80	:	4.3
3831	:	Optical instruments and lenses; sighting	:		:		:		:	-, -
	:	and fire control equipment	: 63	L		2.9				14.2
2351	:	Millinery, hats, caps	: 6	2		2.9				6.6
3229A	:	Pressed and blown glass	• 6	3		2.8				4.1
3851	•	Photographic equipment and supplies	• •	4		2.7				6.3
3423	:	Hand and edge tools, n.e.c	. 0	5		2.7				5.5
2046	:	Wet corn milling	•: 0	6		2.7				1.5
2022	:	Natural and process cheese	·: 6	7		2.7				3.4 5.3
3964	:	Needles, pins and fasteners	·: 6	8		2.6				7.9
2815	:	: Cyclic intermediates and crudes(chemicals)-	·: 6	9		2.6				3.1
3542	:	Metal-forming machine tools	•: /	0		2.5				4.2
3425	:	Hand saws and saw blades	-: /	1		2.5				6.7
2816	:	Inorganic pigments	-: 7	2	:	2.5		: 63	•	0.7
3313B	;	: Electrometallurgical products; cold	:	_	:			• (0	:	9.0
	:	finished steel: steel pipe and tube		3		2.4				9.6
3693	:	· Y-Ray apparatus and tubes	-: /		:	2.2				2.0
3652		Phonograph records	-: /		:	2.2				8.2
3312	;	· Rlast furnaces and steel mills	-: /	6		2.1				2.6
2034	;	: Dehydrated food products	-: /	7		2.1				2.0
2023		: Condensed and evaporated milk	-: 7	8	:	2.1	-	: 114	. •	۷.1
	:	•	:		:			•	•	
		:	:		:			•	•	

Table 3.--U.S. imports f.o.b. relative to domestic shipments, etc. (cont'd)

SIC/TRC	:	Description		8-60	1968	
Code	:		Rank	: Value	Rank :	Value
2/22	:	Dismitted States and I am a fi			:	
3432	:	Plumbing fittings and brass goods:				
3241	:	Hydraulic cement:				
2082	:	Malt and malt liquors (inc. 2083)				
3293	:	Gaskets and insulations				
3621		Motors and generators				
3612		Transformers	117	: 0.8	109	2.2
35XX <u>1</u> /	:	Miscellaneous non-electrical	}		:	}
	:	machinery, n.e.c		: 0.8	106 :	2.4
3551		Food products machinery		: 0.8	67	6.2
2879		Agricultural chemicals, n.e.c		: 0.8	149 :	1.1
2295		Coated fabrics, not rubberized		: 0.8	: 141 :	1.3
2087		Flavoring extracts and syrups, n.e.c		: 0.8	: 159 :	0.8
36XX <u>1</u> /		Miscellaneous electrical machinery, n.e.c	123	: 0.7	128 :	1.6
34XX <u>1</u> /	:	Miscellaneous fabricated metal	}	:	:	}
	:	products, n.e.c	124	: 0.7	143 :	1.2
3255	:	Clay and non-clay refractories	125	: 0.7		
2831	:	Biological chemical products	126	: 0.7		
2822		Synthetic rubber				
2291		Felt goods, n.e.c		: 0.7		
2098		Macaroni and spaghetti:				
3661		Telephone and telegraph apparatus:				
3431		Metal sanitary wares				
2131		Chewing and smoking tobacco				
3811		Scientific instruments; mechanical and	132	• 0.0	, , , , ,	4.0
3011	:	measuring devices; automatic tempera-		•	•	
	•	ture controls	133	. 0.5	116	2.0
3721	•	Complete aircraft (Partial: 37211B, 37212,		• 0.5	110	2.0
J121	:	37213)		. 0 5	1/7	
3631	-	Household cooking equipment and household	134	: 0.5	147	1.1
3031	:	electrical appliances, n.e.c.	125	. 0 .	100	1 0
3561	-	Pumps and compressors				
3519		=				
3357		Internal combustion engines, n.e.c				
		Nonferrous wire and drawing mills:				
3069		Rubber and plastic products, n.e.c:				
2843		Surface active agents:				
2391		Curtains and draperies:				
2281		Yarn mills, excl. wool:				
2095		Roasted coffee:		•		
3843		Dental equipment and supplies:				
		Miscellaneous transport equipment, n.e.c:				
3691	:	Storage batteries:	146	0.4 :	135 :	1.4
3511	:	Steam engines and turbines:	147	0.4	136:	1.4
	:	:	;	:	:	
	:	:	;	: :	:	
See fo	ot	notes at end of table.				

Table 3.--U.S. imports f.o.b. relative to domestic shipments, etc. (cont'd)

SITC/TRC:		1958	2_4	50	.	10	68
Code :	Description		_	Value	-:-		Value
		Kank	÷	Value	÷	Kank :	
3494	Valves and pipe fittings:	148		0.4		111 :	
2812	Alkalies and chlorine:	149		0.4	- 7	162 :	
2631	Paperboard mills:			0.4		181 :	
	Furniture and fixtures:	151		0.4		129	
	Thread mills:	152		0.4		153 :	
	Knit fabric mills:			0.4		145	
	Rice milling:			0.4		192	
	Pens and mechanical pencils:			0.3		137 :	
3623	Electric welding apparatus:			0.3		151	
3429	Hardware, n.e.c:	157		0.3		131	
3274	Lime:			0.3		139	
3131	Footwear cut stock			0.3		155	
2892	Explosives:	160		0.3		119	
	Paper and allied products, n.e.c:			0.3		174	
2371	Fur goods:	162		0.3		104	
	Women's hosiery, excl. socks			0.3		176	
	Heating equipment, except electric:			0.2		166	_
3321	Gray iron foundries:	165		0.2		179	
3261	Vitreous plumbing fixtures	166				160	
3221	Glass containers	167		0.2		163	
	Reclaimed rubber			0.2		123	
2051 :	Bread, cake, other baked goods	169		0.2		169	
2041 :	Flour and other grain mill		:		:		
	products (incl. 2042, 2045)	170	:	0.2	:	177	0.3
3632	Household refrigerators and freezers	171		0.1	:	126	1.7
3585	Refrigeration machinery			0.1		165	
3535	Conveyors and conveying equipment			0.1		152	
	Metal barrels, pails, drums, cans,		:		:	•	:
:	collapsible tube:	174	:	0.1	:	171	0.3
3322	Malleable iron foundries	175	:	0.1	:	167	0.4
3251 :	Brick and structural clay products		:	0.1	:	173	0.3
2895 :	Carbon black	177	:	0.1	:	183	0.1
2851 :	Paints and allied products	178	:	0.1	:	188	: 0.0
27XX 1/ :	Printing and publishing, n.e.c	179	:	0.1		180	0.2
	Chewing gum	180	:	0.1	:	164	0.5
2015 :	Poultry dressing plants	181	:	0.1	:	186	0.1
	Locomotives and parts; railroad and		:		:		:
	street cars	182	:	0.0	:	178	0.2
3633 :	Household laundry equipment	183		0.0		187	
•			:		:		•
:			:		:		:
See foo	tnotes at end of table.						

Table 3.--U.S. imports f.o.b. relative to domestic shipments, etc. (cont'd)

SIC/TRC	;	Description	:	195	8	-60	:	19	68	8
Code	:		:	Rank	:	Value	:	Rank	:	Value
	:		:		:		:		:	
3537	:	Industrial trucks and tractors	:	184	:	0.0	:	154	:	0.9
3534	:	Elevators and moving stairways	:	185	:	0.0	:	148	:	1.1
3271	:	Block, brick, and other concrete products	:	186	:	0.0	:	182	:	0.1
2642	:	Envelopes	:	187	:	0.0	:	184	:	0.1
2441B	:	Wooden containers	:	188	:	0.0	:	168	:	0.4
2111	:	Cigarettes	:	189	:	0.0	:	189	:	0.0
2092	:	Soybean oil mills	:	190	:	0.0	:	190	:	0.0
2086	:	Bottled/canned soft drinks	:	191	:	0.0	:	191	:	0.0
2043	:	Cereal preparations	:	192	:	0.0	:	185	:	0.1
2 0 24	:	Ice cream and frozen desserts	:	193	:	0.0	:	193	:	0.0
2021	:	Creamery butter	:	194	:	0.0	:	194	:	0.0
	:		:		:		:		:	

 $[\]underline{1}/$ Items cited by 2-digit plus "XX" are residuals obtained by netting all hard 4-digit entries from 2-digit SIC totals given in basic source.

General.--For more detailed industry/product descriptions, see basic data source: Trade Relations Council of the United States, Inc., Employment, Output, and Foreign <a href="Trade of U.S. Manufacturing Industries, 1958-68/69, 3rd, ed., 1971

Table 4.--U.S. exports f.a.s. relative to domestic shipments, by industry, 1958-60 (avg.) and 1968

(Values in percent) SIC/TRC: 1958-60 1968 Description code Value Rank: Rank : Value 2044 : Rice milling----: 1: 37.8: 2: 62.2 2094 Animal and marine fats and oils----: 2: 33.1: 4: 27.8 2895 Carbon black----: 32.6: 20: 14.2 2831 Biological products----: 26.5: 13: 17.4 3713B : Truck trailers and bodies; bus bodies; motor vehicle parts and accessories (incl. 3714, 3715)----: 5: 26.4: 6: 24.4 2611 : Pulp mills----: 6: 26.1: 3: 28.9 2822 Synthetic rubber----: 7: 24.8: 10: 17.8 3636 : Sewing machines----: 8: 24.7: 5: 24.8 2861 : Gum and wood chemicals----: 9: 22.6: 7: 24.2 3542 : Metal-forming machine tools----: 10: 20.7: 26: 13.5 3841 : Surgical and medical instruments----: 11: 20.3: 21: 14.0 3552 : Textile machinery----: 12: 18.6: 15: 15.9 2034 : Dehydrated food products----: 13: 15.8: 30: 12.8 3554 : Paper industries machinery----: 14: 15.7: 24: 13.7 35XX 1/ : Nonelectrical machinery, n.e.c----: 15: **15.3**: 31: 12.2 2879 Agricultural chemicals, n.e.c----: 16: 14.8: 28: 13.4 3742 : Locomotives and parts; railroad and street cars----: 17: 14.1: 122: 2.2 3951 : Pens and mechanical pencils----: 18: 13.5: 33: 11.1 3551 Food products machinery----: 19: 13.4: 17: 15.2 2023 : Condensed and evaporated milk----: 20: 13.4: 40: 8.7 3913 Lapidary work----: 21: 12.6: 1: 94.2 2091 : Cottonseed oil mills----: 22: 12.2: 97: 3.0 3721 : Complete aircraft (partial: items 37211B, : 37212, 37213)-----: 23: 11.7: 9 22.5 : 3555 : Printing trades machinery----: 24: 11.6: 29: 13.3 3561 : Pumps and compressors----: 25: 11.5: 18: 14.9 3537 : Industrial trucks and tractors----: 26: 11.2: 38: 9.0 3843 : Dental equipment and supplies----: 27: 10.6: 35: 10.7 3522 : Farm machinery and equipment----: 28: 10.0: 36: 10.1 3693 : Xray apparatus and tubes----: 29: 9.5: 12: 17.5 3623 : Electric welding apparatus----: 30: 9.5: 43: 8.5 3553 : Woodworking machinery----: 31: 9.5: 32: 11.4 3573 Computing and related machines; office machinery, n.e.c----: 32: 9.2: 23: 14.0 3423 : Hand and edge tools, n.e.c----: 33: 9.1: 44: 8.4 2092 : Soybean oil mills----: 34: 9.0: 16: 15.5 29XX 1/ : Chemicals and allied products, n.e.c----: 35 : 8.6: 50: 7.9 3831 : Optical instruments and lenses; sighting and fire control equipment----: 36: 8.5 : 48: 7.9

Table 4.--U.S. exports f.a.s. relative to domestic shipments, by industry, 1958-60 (avg) and 1968--Continued

SIC/TRC	:	Description	:_	1958-	60	:	19	68	
code	:	Description	:	Rank:	Value	:	Rank	: V	alue
	:		:	:		:		:	
3585	:	Refrigeration machinery		37 :	8.5	:	37	:	9.0
3255	:	Clay and nonclay refractories	:	38 :	8.5	:	46	:	8.3
2833	:	Medicinals; botanicals; pharmaceuticals	:	39 :	8.5	:	58	:	6.1
3536	:	Hoists; cranes; monorails	:	40 :	8.3	:	83	:	3.9
3511	:	Steam engines and turbines	:	41 :	8.3	:	34	:	10.8
3811	:	Scientific instruments; mechanical and	:	:		:		:	
	:	measuring devices; automatic tempera-	:	:		:		:	
	:	ture controls	:	42 :	7.5	:	22	:	14.
3652	:	Phonograph records	:	43 :	7.3	:	73	:	4.
3861	:	Photographic equipment and supplies	:	44 :	7.2	:	42	:	8.
3624		Carbon and graphite products		45 :	7.2	:	49	:	7.
3815		Cyclic intermediates and crudes (chemicals)		46 :	7.1	:	27	:	13.
3494		Valves and pipe fittings		47 :				:	8.
3031		Reclaimed rubber		48 :				:	5.
3425	:	Hand saws and saw blades	:	49 :					5.
1519		Internal combustion engines, n.e.c		50 :					8.
843		Surface active agents		51 :					8.
892	:	Explosives		52					1.
241	:	Narrow fabric mills		53 :					3.
6XX 1/		Electrical machinery, n.e.c		54					3.
229A	:	Pressed and blown glass	•	55 :					7.
535		Conveyors and conveying equipment		56					4.
572		Typewriters	•	57 :					7.
339	:	Primary nonferrous metals, n.e.c		58 :				:	23.
131		Chewing and smoking tobacco		59 :					17
671B		Electron tubes; cathode ray picture tubes		60 :					4.
621		Motors and generators		61 :					7
3XX 1/		Apparel and related products, n.e.c		62					1
073		Chewing gum		63					1
221	:	Synthetic fiber weaving mills and finish-		05 :		•	137	:	
	•	ing plants	•	64		:	101	:	2
069	•	Rubber and plastic products, n.e.c		65 :					5
429		Special product sawmills, n.e.c		66 :					5.
692		Dry and wet primary batteries		67 :				:	
334		Primary aluminum		68 :				•	3
823B		Cellulosic manmade and noncellulosic	•			٠	04	•	3
02311	:		:	(0		:	0.0	:	2
093A	:	organic fibers; tire cord and fabric		69 :					3
611		Vegetable oil mills, n.e.c. (incl. 2096)		70 :					5
		Electrical measuring instruments		71 :					16
031 6744		Canned and cured seafoods		72 :					4.
674A		Semiconductors		73:					14
632		Household refrigerators and freezers		74 :					1
891 356		Adhesives and gelatin		75 :					3
356		Nonferrous rolling and drawing mills, n.e.c		76 :					7
087	:	Flavoring extracts and syrups, n.e.c		77 :					3
816	:	Inorganic pigments	:	78 :	4.4	:	67	:	5
	:	•	•	:		:		:	

Table 4.--U.S. exports f.a.s. relative to domestic shipments, by industry, 1958-60 (avg.) and 1968--Continued

SIC/TRC	:	Description		_	-60	: _	196	
code	:	Description	Rank	:	Value	:	Rank:	Value
	:		;	:		:	:	
3264B	:	Porcelain electrical supplies and pottery	3	:		:	:	_
		products	: 79	:	4.3		59 :	
3261	:	Vitreous plumbing fixtures	: 80	:	4.3		125 :	
2812	:	Alkalies and chlorine	81	:	4.3	:	68 :	
2294	:	Processed textile waste	82	:	4.2		108:	
2211	:	Cotton weaving mills and finishing plants	: 83	:	4.2	:	116 :	
3291	•	Abrasive products	: 84	. :	4.1	:	62 :	
2731	•	Book publishing	: 85	:	3.8	:	56 :	6
3433	:	Nonelectric heating equipment	: 86	:	3.8	:	86	3
2041	:	Flour and other grain mill products (incl.	:	:		:	;	:
2041	•	2042, 2045)	: 87	:	3.7	:	121 :	2
2051	•	Opthalmic goods	: 88	:	3.6	:	104	2
3851	•	Radio and TV receiving sets	: 89	:	3.6		99	
3651A	:	Household cooking equipment; other house-	•	•		:		•
3631	:	hold electric appliances, n.e.c	• 90	· :	3.6		105	2
	:	Cigarettes	• 91	. :			77	
2111	:	Ulgarettes	. 02	· •			91	
3641	:	Electric lamps	. 02	· •			47	
2631	:	Paperboard mills	. 0/	, .			25	
39XX <u>1</u> /	:	Miscellaneous manufacturing, n.e.c	. 92				70	
3111	:	Leather tanning and finishing	. 92	•				
2295	:	Coated fabric, not rubberized	: 96	5 ;			88	_
3931	:	Musical instruments and parts	: 9,	7 ;	3.2	•	72	
2032	:	Canned specialties (incl. canned and	:	. :		:	7.00	: . 1
	:	frozen fruits and vegetables)	: 98	3 :	3.2	:	138	: 1
3313B	:	Electrometallurgical products; cold	:	:		:		:
	:	finished steel; steel pipe and tube	: 99)			119	
3312	:	Blast furnaces and steel mills	: 100	-				
3949	:	Sporting and athletic goods	: 10	L.				
3612	:	Transformers	: 103	2	3.0	:		
3211B	:	Flat glass	: 10	3	3.0	:		
2871	:	Fertilizers	·: 10	4	: 3.0	:	52	
3963	•	Ruttons	·: 10.	5	: 2.8	:	103	: 2
37XX 1/	•	Transport equipment, n.e.c	: 10	6	: 2.8	:	117	: 2
3633	•	Household laundry equipment	·: 10	7	: 2.8	:	112	: 2
3661	•	Telephone and telegraph apparatus	-: 10	8	: 2.7	:	135	: 1
	:	Saw and planing mills						:
2421B	•	Metal sanitary wares	-: 11					: 2
3431	٠	Hardware, n.e.c	-: 11					: 2
3429	•	Primary zinc	-: 11		_			
3333	:	Gaskets and insulations	· 11	_				
3293	:	Elevators and marries stairmens	· 11					
3534	:	Elevators and moving stairways	-: 11					
2621	:	Paper mills (excl. building paper)	II					
3996	:	Hard surface floor coverings	-: 11					_
3941	:	Games and toys	-: 11					
3432		Plumbing fittings and brass goods	-: 11	ŏ	: 2.3	, ;	113	•

Table 4.--U.S. exports f.a.s. relative to domestic shipments, by industry, 1958-60 (avg.) and 1968--Continued

SIC/TRC	:		:	1958	3-6	50	:_	19	_	
code	:	Description	R	ank :	: 7	<i>l</i> alue	:	Rank	:	Value
	:		:		:		:		:	
3263	:	Fine earthenware food utensils	:	119	:	2.3	:	114	:	2.5
2283	:	Thread mills		120	:	2.3	:	130	:	2.0
3421	:	Cutlery		121	:	2.2	:	87	:	3.7
3221	:	Glass containers		122	:	2.2	:	153	:	1.3
3411B		Metal barrels, pails, drums, cans, col-	:		:		:		:	
	:	lansible tube	:	123	:	2.1	:	176	:	0.4
2256	:	Knit fabric mills	:	124		2.1		155	:	1.3
3711	:	Passenger cars and chassis (partial:	:		:		:		:	
,, <u></u>	:	item 37111)	:	125		2.0	:	81	:	4.0
34XX 1/	:	Fabricated metal products, n.e.c		126		2.0		95		3.
3262	:	Vitreous china food utensils	:	127		2.0		132		1.9
3121		Industrial leather		128		2.0		123	:	2.
24XX 1/		Lumber and wood products, n.e.c		129		2.0		64		5.
2015	•	Poultry dressing plants	•	130		2.0		148		1.
2342	•	Corsets and allied garments	•	131		1.9		100		2.
2298	•	Cordage and twine	•	132		1.9		115		2.
2046		Wet corn milling	•	133		1.9		57		
3914	•	Silverware and plated ware	•	134		1.7		161		
3481	:	Fabricated wire products	•	135		1.7		118		-
3357	•	Nonferrous wire and drawing	•	136		1.6		144		
	•	Nordles sine and drawing	•	137		1.5		102		
3964	•	Needles, pins, and fasteners	•	138		1.5		150		
3872B	•	Prints and allied and death	•			1.5		129		
2851	:	Paints and allied products	•	139		1.5		126		
2281	:	Yarn mills, excluding wool Dolls	•	140		1.4		139		
3942				141						
3171	:	Handbags and purses	•	142		1.4				
2391	:	Curtains and draperies	•	143		1.4				
2043	:	Cereal preparations	•:	144		1.4				
2011	:	Meat packing plants	•:	145		1.4				
3751	:	Motorcycles, bicycles and parts	• :	146		1.3				
26XX <u>1</u> /	:	Paper and allied products, n.e.c	• :	147		1.2				
396 2	:	Artificial flowers	•:	148		1.1				
3691	:	Storage batteries	-:	149		1.1				
3161	:	Luggage	-:	150		1.1				
3131	:	Footwear cut stock	-:	151		1.1				
3991	:	Brooms and brushes	-:	152		1.0				
2021	:	Creamery butter	-:	153	:	1.0				
32XX <u>1</u> /	:	Stone, clay and glass products, n.e.c	-:	154	:	0.9	:			
3281	:	Cut stone and stone products	-:	155	:	0.9	:	177	,	
3251	:	Brick and structural clay products	-:	156	:	0.9	:	178	3	: 0
2251		Women's hosiery, excluding socks		157	:	0.9	:	174	ŀ	: 0
25XX 1/	:	Furniture and fixtures	-:	158	:	0.8	:	168	3	: 0
2371	:	Fur goods	-:	159	:	0.8	:	158	3	: 1
2351	:	Millinery, hats, caps	-:	160		0.8				
2291	:	Felt goods, n.e.c	-:	161		0.8				
-		O	•		•	- • •		· · · · · ·	-	. <i>-</i>
	٠	note at end of table.	•		•		•	-		

Table 4.--U.S. exports f.a.s. relative to domestic shipments, by industry, 1958-60 (avg.) and 1968--Continued

SIC/TRC	: Description	:_	1958	-60	:_	1968	
code	:	:	Rank	: Value	:	Rank:	Value
		:		:	:	:	
2095	: Roasted coffee	-	162	0.8	:	163:	1.0
3321	: Gray iron foundries		163	: 0.7	:	152:	1.3
3274	: Lime	•	164	0.7	:	141:	1.6
3253	: Ceramic wall and floor tile		165	: 0.7	;	167:	0.6
3172	: Personal leather goods	:	166	: 0.7	:	172:	0.5
27XX <u>1</u> /	: Printing and publishing, n.e.c		167	: 0.7	:	165:	0.7
2644	: Wallpaper		168	: 0.7	:	71 :	5.1
2432	: Veneer and plywood		169	: 0.7	:	158:	1.1
2311	: Miscellaneous apparel		170	: 0.7	:	173 :	0.5
2098	: Macaroni and spaghetti	:	171	: 0.7	:	147 :	1.4
2441B	: Wooden containers	:	172	: 0.6	:	179 :	0.4
3871	: Watches and clocks	:	173	: 0.5	:	134:	1.7
3141B	: Shoes, including house slippers	:	174	: 0.5	:	182:	0.3
2085	: Distilled and bottled liquors (partial:	•		:	:	:	
	20851 , 20853)	:	175	: 0.5	:	136:	1.7
2082	: Malt and malt liquors (incl. 2083)	:	176	: 0.5	:	187 :	0.2
2071	: Confectionery products	:	177	: 0.4	:	171 :	0.6
3332	: Primary lead		178	: 0.3	:	180 :	0.3
3322	: Malleable iron foundries	:	179	: 0.3	:	140 :	1.6
3151	: Leather gloves and mittens	:	180	: • 0.3	:	120:	2.4
2022	: Natural and process cheese	:	181	: 0.3	:	188:	0.2
3241	: Hydraulic cement	:	182	: 0.2	:	181 :	0.3
3021	: Rubber footwear	:	183	: 0.2	:	183 :	0.3
2642	: Envelopes	:	184	: 0.2	: 3	190:	0.1
2231	: Wool weaving and finishing mills	:	185	: 0.2	:	191:	0.1
2121	: Cigars		186	: 0.2	:	170:	0.6
2084	: Wines, brandy, brandy spirits	:	187	: 0.2	:	184 :	0.3
2061	: Sugar (incl. 2062, 2063)	:	188	: 0.2	:	185 :	0.3
3271	: Block, brick, and other concrete product	s:	189	: 0.1	:	189 :	0.1
22XX 1/	: Textile mill products, n.e.c		190			169:	0.6
2283	: Wool yarn mills	:	191	: 0.1	:	186:	0.2
2051	: Bread, cake, other baked goods	:	192	: 0.1	:	192:	0.1
2086	: Bottled/canned soft drinks		193			193:	0.0
2024	: Ice cream and frozen deserts		194			194:	0.0
	:	:		:	:	:	

^{1/} Items cited by 2 digits plus "XX" are residuals obtained by netting all hard 4-digit entries from 2-digit SIC totals given in basic source.

GENERAL: For more detailed industry/product descriptions, see basic data source: Trade Relations Council of the United States, Inc., Employment, Output, and Foreign Trade of U.S. Manufacturing Industries, 1958-68/69, 3d ed., 1971.

Table 5.--Relative changes in ratios of U.S. imports and exports to domestic shipments, 1958-60 (Avg.) to 1968, by industry

(Values in percent)

SIC/TRC	:	(Values in percent) Description	Impor				orts	
Code	:		Rank	:	Value	: Rank	: Valu	ie_
	:		}	:		:	:	
2024	:	Ice cream and frozen desserts		:	187.0	: 83	: 10.	. 5
3537	:	Industrial trucks and tractors		:	186.7	: 134	: -21.	. 3
3534		Elevators and moving stairways		:	184.3	: 76	: 15.	. 2
3632		Household refrigerators and freezers		:	182.2	: 189	:-115.	. 5
3172	:	Personal leather goods	5	:	166.7	: 166	: -47.	. 6
2073		Chewing gum		:	164.6	: 188	:-110.	. 3
3535		Conveyors and conveying equipment		:	158.9	: 145	: -28.	. 2
2371	:	Fur goods	8	:	158.8	: 63	: 23.	. 9
3031		Reclaimed rubber	9	:	157.7	: 140	: -23.	.1
3742	:	Locomotives and parts; rail and	;	:		:	:	
	:	street cars		:	157.1	: 194	:-146	. 3
3536	:	Hoists, cranes, monorails	: 11	:	156.6	: 182	: -72	. 8
2441B	:	Wooden containers	12	:	156.2	: 142	: -25	. 4
3942		Dolls		:	155.8	: 80	: 12.	. 5
2131	:	Chewing and smoking tobacco	14	:	155.0	: 17	: 96	.9
3519	:	Internal combustion engines, n.e.c	15	:	154.3	: 67	: 19	. 7
2892	:	Explosives	16	:	153.8	: 191	:-121	. 4
3551	:	Food products machinery	: 17	:	152.7	: 79	: 12	.9
3713B	:	Truck trailers and bodies, bus bodies;	:	:		:	: -	
	:	motor vehicle parts and accessories	:	:		:	:	
	:	(incl. 3714, 3715)	: 18	:	150.8	: 110	: -7	.8
3624	:	Carbon and graphite products	: 19	:	150.0	: 88	: 8	.9
3121	:	Industrial leather belting and leather	:	:		:	:	
	:	goods, n.e.c	20	:	149.8	: 89	: 8	.9
3843	:	Dental equipment and supplies	21	:	146.2	: 100	: 0	.5
3585	:	Refrigeration machinery	22	:	144.1	: 92	: 6	.6
3429	:	Hardware, n.e.c	23	:	141.4	: 146	: -28	.9
3494	:	Valves and pipe fittings	24	:	138.5	: 61	: 24	.5
3554	:	Paper industries machinery	25	:	136.8	: 122	: -14	.0
2391	:	Curtains and draperies	26	:	133.2	: 115	: -9	. 3
3274	:	Lime			133.1		: 82	.0
3322	:	Malleable iron foundries	28	:	131.6	: 5	: 130	. 4
3831	:	Optical instruments and lenses; sighting		:		:	:	
	:	and fire control equipment	29	:	131.3	: 112	: -8	.1
3552	:	Textile machinery			130.8		: -15	.8
2043	:	Cereal preparations			130.6		: 99	
3171	:	Handbags and purses	32		130.2		: -57	
3141B	:	Shoes, including house slippers	33				: -64	
3693	:	X-ray apparatus and tubes	34		124.0			.5
	:		;	:		:	:	-
	:		:	:		:	:	
a								

Table 5.--Relative changes in ratios of U.S. imports and exports, etc. (cont'd)

(Values in percent) SIC/TRC : Imports Exports Description Rank : Value : Rank : Value Code : : 3811 : Scientific instruments; mechanical and : measuring devices; automatic temperature controls----: 35:121.3: 29: 60.8 : Synthetic rubber----: 36: 120.4: 150 : -33.12822 : Furniture and fixtures----: 37:119.8: 154 : -35.525XX 1/ : Pens and mechanical pencils----: 38: 119.7: 130 : -19.53951 : Transport equipment, n.e.c.---: 39:119.1: 125 : -15.437XX 1/ : Blast furnaces and steel mills----: 40 : 117.4 : 168 : -49.53312 : Electrometallurgical products; cold 3313B 41:115.8: 137 : -22.3finished steel; steel pipe and tube----: 18: 89.3 : Storage batteries----: 42:115.7: 3691 : Pumps and compressors----: 43:115.2: 58 : 25.9 3561 44:112.9: : Vitreous plumbing fixtures----: 179 : -67.73261 3631 : Household cooking equipment; other house- : hold electric appliances, n.e.c.----: 45 : 112.1 : 144 : -25.9: Surface active agents----: 64: 23.9 2843 46: 111.3: : Electrical measuring instruments----: 12:104.8 47: 110.7: 3611 : Steam engines and turbines----: 48: 109.4: 59: 25.5 3511 : Knit fabric mills----: 49:108.6: 169: -51.8 2256 : Semiconductors----: 15: 98.4 50: 107.5: 3674A : Dry and wet primary batteries----: 51: 106.4: 158 : -40.93692 : Rubber and plastics products, n.e.c.----: 52:105.1: 98: 0.9 3069 : Motors and generators----: 53:104.3: 68: 18.7 3621 : Woodworking machinery----: 54:103.8: 70: 18.2 3553 : Cyclic intermediates and crudes----: 55: 100.5: 27: 62.4 2815 : Metal sanitary wares----: 139 : -22.756:100.1: 3431 : Animal and marine fats and oils----: 128: -17.3 57: 99.6: 2094 138: -22.6 : Non-electrical machinery, n.e.c.---: 58: 98.3: 35XX 1/ : Glass containers----: 98.2: 171 : -53.259 : 3221 : Transformers----: 60: 98.0: 121 : -13.83612 Brooms and brushes----: 96.8: 57 : 28.4 61: 3991 123 : -14.5: Footwear cut stock----: 62: 96.3: 3131 2032 : Canned specialties (incl. canned and 175 : -60.395.6: frozen fruits and vegetables)----: 63: 32.0 : Sporting and athletic goods----: 64: 94.5: 50: 3949 Computing and related machines; office 3573 machines, n.e.c.----: 65: 93.9: 41: 41.2 : Ceramic wall and floor tile----: 108 : -5.493.8: 3253 66: : Electric welding apparatus----: 67: 93.1: 118 : -10.83623 : Nonferrous wire and drawing----: 117: -10.1 68: 92.6: 3357 : Inorganic pigments----: 69 : 18.2 70: 91.8: 28.16 : :

Table 5.--Relative changes in ratios of U.S. imports and exports, etc. (cont'd)

(Values in percent) SIC/TRC: Imports Exports Description : Rank : Value : Rank: Value Code : 52: 31.5 : Yarn mills, excl. wool----: 71: 91.0: 2281 : Telephone and telegraph apparatus----: 72: 89.4: 164: -44.0 3661 : Miscellaneous apparel----: 135 : -21.673: 89.1: 2311 : Radio and TV receiving sets----: 129 : -19.53651A 74: 84.6: : Fine earthenware food utensils----: 94: 75: 83.2: 5.5 3263 : Sewing machines----: 76: 83.2: 101: 0.4 3636 : Electrical machinery and equipment, n.e.c.-: 170 : -52.736XX 1/ 77: 82.7: 78: 82.2: 149 : -32.43671B : Electron tubes; cathode ray picture tubes--: 79: 82.2: 180 : -68.53281 : Cut stone and stone products----: 81.6: : Roasted coffee----: 80: 71: 18.2 2095 105 : -2.2: Heating equipment, excluding electric-----81: 80.6: 3433 3711 : Passenger cars and chassis (Partial: item : 82 : 25: 66.0 37111)-----: 80.4: : Ophthalmic goods----: 83 : 80.2: 143 : -25.83851 Complete aircraft (Partial: items 37211B, : 3721 37212, 37213)-----: 79.8: 26: 63.1 Millinery, hats, caps----: 56: 28.9 85 : 76.9: 2351 : Bread, cake, other baked goods----: 120 : -13.386: 76.8: 2051 : Leather gloves and mittens----: 3:150.5 87 : 74.4: 3151 183 : -73.2: Brick and structural clay products----: 88: 72.1: 3251 : Hand and edge tools, n.e.c.---: 89 : 69.1: 111 : -8.03423 : Needles, pins, and fasteners----: 28: 61.1 3964 90: 67.5: 2241 : Narrow fabric.mills----: 91: 66.5: 176 : -63.1: Gaskets and insulations----: 92: 66.2: 72: 17.8 3293 : Book publishing----: 93: 32: 56.4 65.3: 2731 : Fabricated wire products----: 49 : 94: 64.5: 32.5 3481 : Cutlery----: 95: 36: 49.5 63.5 : 3421 : Leather tanning and finishing----: 62.5: 43: 39.4 96: 3111 3411B : Metal barrels, pails, drums, cans, : collapsible tube----: 97 : 62.2: 193 :-136.2 : Cotton weaving mills and finishing plants--: 98: 62.1: 167 : -48.92211 : Primary zinc----: 99 : 61.5: 85: 10.15 3333 59.4: 6:119.639XX 1/: Miscellaneous manufacturing, n.e.c.---: 100: : Corsets and allied garments----: 39 : 45.3 101: 58.7: 2342 : Musical instruments and parts----: 102: 38.6: 38: 46.2 3931 151 : -33.12833B : Medicinals, botanicals, pharmaceuticals----: 103: 56.1: : Envelopes----: 187 : -99.22642 104: 55.5 : 66: 20.4 : Alkalies and chlorine----: 2812 105: 55.4: : Electric lamps----: 106: 55.1: 95: 2.0 3641 34XX 1/: Fabricated metal products, n.e.c.---: 107 : 54.1: 42: 40.9 : : : : :

Table 5.--Relative changes in ratios of U.S. imports and exports, etc. (cont'd)

(Values in percent) Imports Exports SIC/TRC: Description : Value : Value : Rank Rank Code : 136 : -22.2: Hand saws and saw blades----: 108: 51.2: 3425 : Printing trades machinery----: 50.4: 78: 13.6 109: 3555 : Cellulosic manmade and non-cellulosic 2823B 156 : -39.2organic fibers; tire cord and fabric----: 50.1: 110: : Primary aluminum----: 49.8: 153 : -34.4111: 3334 : Confectionery products----: 112: 49.8: 47 : 33.9 2071 96: 49.5: 1.5 : Bottled and canned soft drinks----: 113: 2086 -2.6: Clay and non-clay refractories----: 114: 49.3: 106: 3255 -0.4103: 27XX 1/ : Printing and publishing, n.e.c.---: 115: 48.6: : Coated fabrics, not rubberized----: 116: 47.9: 81 : 11.8 2295 46.7: : Vitreous china food utensils----: 117: 109 : -6.53262 : Games and toys----: 147 : -28.9118: 45.7 : 3941 : Macaroni and spaghetti----: 119: 24: 66.6 44.4 : 2098 : Motorcycles, bicycles and parts----: 43.0: 91: 6.6 120 : 3751 : Wallpaper----: 41.5: 4:149.8 121: 2644 : Wines, brandy, brandy spirits----: 65: 23.1 122: 39.8: 2084 : Buttons----: 104 : -1.9123: 39.5: 3963 : Cottonseed oil mills----: 37.5: 190 :-121.0 124: 2091 181 : -71.7: Wool weaving and finishing mills----: 125: 37.3: 2231 := Flat glass-----: 126 : 36.7 : 45: 37.3 3211B : Pressed and blown glass----: 36.5: 75: 16.3 127: 3229A : Saw- and planing mills----: 36.2: 44 : 38.2 128: 2421B 141: -24.1 36.0: 129: : Block, brick, and other concrete products --: 3271 34.9: 107 : -3.9: Meat packing plants----: 130 : 2011 : Household laundry equipment----: 119 : -13.033.1: 131: 3633 20: 86.8 : Hard surface floor coverings----: 132: 32.5: 3996 : Flour and other grain mill products (incl. : 2041 2042, 2045)-----: 32.5: 165 : -45.3133: : Distilled and bottled liquors (20851 2085 13:102.5 plus 20853)-----: 32.4: 134: : Luggage----:: 31.5: 46: 37.0 135: 3161 : Carbon black----: 184 : -78.930.9: 136: 2895 93: 5.5 30.9: Special product sawmills, n.e.c.---: 137 : 2429 155 : -36.9: Surgical and medical instruments----: 138: 30.3: 3841 : Rubber footwear----: 139: 29.7: 55: 29.3 3021 140: 29.7: 116: -9.8: Agricultural chemicals, n.e.c.---: 2879 97: 1.0 : Vegetable oil mills, n.e.c. (incl. 2096)---: 141: 28.4: 2093 51: 31.5 142: 28.3: : Wool yarn mills----: 2283 : Biological products----: 159: -41.1 28.1: 143: 2831 : Veneer and plywood-----: 50.6 27.4: 35 : 144: 2432 34: 52.6 Hydraulic cement----: 25.6: 145: 3241 : :

Table 5.--Relative changes in ratios of U.S. imports and exports, etc. (cont'd)

SIC/TRC	:	(Values in percent)	Impo			Ехро	rts
Code	:	:	Rank	:	Value :	Rank:	Value
	:			:	;	:	
2022	:	Natural and process cheese:	146	:	22.9:	132 :	-20.
3264B	:	Porcelain electrical supplies and		:	:		
	:	nottery products	147	:	22.5:		
3572	:	Typewriters	148	:	21.5:		
891	:	Adhesives and gelatin	149	:	20.6		-41.
3542	:	Metal-forming machine tools	150	:	20.2:		-41.
2034	:	Dehydrated food products	121	:	18.9		-21.
3522	:	Farm machinery and equipment	152	:	18.3	99	0.
28XX 1/	:	Chemicals and allied products, n.e.c	153	:	16.1		
3913	:	Lapidary work	154	:	15.6	2	152.
2087	:	Flavoring extracts and syrups, n.e.c	155	:	10.0	131	-20.
2291	:	Felt goods, n.e.c	156	:	9.4	9	: 110.
3872B	:	Watch cases	157	:	8.9	124	-15.
2015	:	Poultry dressing plants	158		7.5	148	: -32.
3339	:	Primary nonferrous metals, n.e.c	: 159		3.4	: 7	: 116.
3 8 61	:	Photographic equipment and supplies	: 160				
356	:	Nonferrous rolling and drawing, n.e.c	: 161				: 45
	•	Condensed and evaporated milk	: 162				: -42
2023	•	Watches and clocks	: 163				: 107
3871	•	Creamery butter	: 164				
2021	:	Gray iron foundries	: 165				
3321	:	Abrasive products	: 166				
3291	:	Adrasive products (in-1 2002)	: 167				: -91
2082	:	Malt and malt liquors (incl. 2083)	: 168				
2621	:	Paper mills, excl. building paper	: 169				: -55
3914	:	Silverware and plated ware	: 170				: -58
2251	:	Women's hosiery, excluding socks	. 170		-10.1		
2031	:	Canned and cured sea foods			-11.6		
26XX <u>1</u> /	:	Paper and allied products, n.e.c			-13.4		: -41
3652	:	Phonograph records			-15.0		
3332	:	Primary lead	. 1/4			• //	• 14
2221	:	Synthetics weaving mills and finishing	. 175	:		. 177	· : -64
	:	plants	170		-17.5		
2061	:	Sugar (incl. 2062, 2063)	÷ 1/0		-19.7		: 30
2298	:	Cordage and twine			-20.3		
2851	:	Paints and allied products			-21.2		
2121	:	Cigars	: 179		-22.2		: 112
3962	:	Artificial flowers	: 180		-23.9		: -83
24XX <u>1</u> /	:	Lumber and wood products, n.e.c	: 181		-27.2		
2111	:	Cigarettes	: 182		: -31.4		
2611	:	Pulp mills	: 183	5	-33.7	: '84	: 10
	:		:	:	:	:	:
	:		:		:	:	:

Table 5.--Relative changes in ratios of U.S. imports and exports, etc. (cont'd)

SIC/TRC	:	Description	:	Im	00	rts	:	Exports
Code	•	Description	:	Rank	:	Value	:	Rank : Value
	:		:	•	:		•	:
2294	:	Processed textile waste	:	184	:	-35.7	:	163 : -43.8
2861	:	Gum and wood chemicals	:	185	:	-39.0	:	90: 6.8
2046	:	Wet corn milling	:	186	:	-52.5	:	11: 106.7
2871	:	Fertilizers	:		:	-64.6	:	19: 87.3
2631	:	Paperboard mills	:	.188	:	-69.8	:	22: 80.8
22XX 1/		Textile mill products, n.e.c			:	-78.6	:	1:168.7
3432		Plumbing fittings and brass goods		190	:	-101.1	:	87 : 9.6
32XX 1/		Stone, clay, and glass products, n.e.c			:	-115.4	:	152 : -34.1
23XX 1/		Apparel and related products, n.e.c		192	:	-140.7	:	192 :-129.0
2044		Rice milling		193	:	-183.7	:	37 : 48.8
2092		Soybean oil mills		194	:	-200.0	:	33: 52.8
	:		:		:		:	•

¹/ Items cited by 2-digits plus "XX" are residuals obtained by netting all hard 4-digit entries from 2-digit SIC totals given in basic source.

GENERAL.—For more detailed industry/product descriptions, see basic data source: Trade Relations Council of the United States, Inc., Employment, Output, and Foreign Trade of U.S. Manufacturing Industries, 1958-68/69, 3rd ed., 1971. Rates of changes are calculated from the following formula:

uble 6.--Summary statistics for measures of import position, export position, and changes in import and export positions

Variable	Median	Mean	: Standard : deviation :	Maximum	Minimum
	(Percent)	(Percent)	•••	(Percent)	(Percent)
ports/domestic shipments, 1958-60 (average)	1.4	6.5	20.0	221.6	0.0
ports/domestic shipments, 1968	2.8	9.2	23.0	259.1	0.0
sports/domestic shipments, 1958-60 (average)	3 .2	5.5	9.9	37.8	0.0
ports/domestic shipments, 1968	3.0	6.2	9.6	94.2	0.0
lative changes in imports/domestic shipments, 1958-60 to 1968	62.2	61.0	66.7	187.0	-200.0
lative changes in exports/domestic shipments, 1968-60 to 1968	1.0	4.8	56.7	168.7	-146.3
Source: Tables 3, 4, and 5.					

average of all the industries' ratios of imports to domestic shipments has risen to a much greater extent than the average for exports--61.0 percent for imports vs. only 4.8 percent for exports. Using a weighted average rather than a simple average, total imports/total domestic shipments increased by about 72 percent, while the analogous ratio for total exports rose by about 9 percent. These latter ratios are equivalent to weighted averages of the industry values for imports and exports relative to domestic shipments, with the domestic shipments as weights. For both imports and exports, therefore, the appearance of weighted averages larger than the unweighted ones indicates that the larger changes are concentrated in the larger industries--i.e. those with the larger domestic shipments. These findings are consistent with an observation often made about the institutional setting of foreign trade in the United States, namely that the industrial sector of the U.S. economy is, in general, oriented considerably more toward the enormous domestic market than toward either foreign markets or foreign suppliers. It is only the larger industries, those which have expanded to the point where acceptable rates of growth in sales and profits require moving into foreign markets, which are impelled to make and expand contacts with other economies. These contacts, and the trade which ensues, lead to a concentration of trading knowledge and trade itself within these same larger industries. While examples can be found of industries characterized by both small domestic shipments and high trade ratios, the generalization that trade--and the most significant changes in trade--remain in the domain of the large industries

continues to be an accurate one.

While it is obvious from table 6 that there have been some large relative changes in import and export ratios, tables 3 and 4 suggest that the ranks of industries by import ratio and by export ratio have not changed drastically from 1958/60 to 1968. The correlation between imports/domestic shipments for 1958/60 and imports/domestic shipments for 1968 is 0.96; for the export ratios the corresponding correlation is 0.68—considerably less than for imports, but still relatively strong. Thus, the changes which occurred from 1958/60 to 1968 can be described more closely as changes within the pattern of trade ratios than as changes of that pattern.

A Look at Some of the Industry Values

A more detailed examination of tables 3, 4, and 5 reveals that many industries which produce roughly similar types of products have had quite different experiences in import and export markets. The tabulation below shows this effect clearly. It is drawn from table 5 and shows how industries in the sample, classed within the relatively broad two-digit SIC groups, ranged in their rankings of relative changes in import and export ratios. For example, the first two-digit group, Food Processing, contains 28 four-digit groups. One of the latter groups ranked number one and one ranked number 194 in terms of change in ratio of imports to domestic shipments over the period 1958/60 to 1968. The remaining four-digit groups in Food Processing had rankings between 1 and 194. With few exceptions, the ranges within two-digit groups are very wide, extending from great to small increases in import penetration,

and from large to small changes in exports relative to domestic shipments.

SIC		Changes in Rankings					
Class	Description	Import Ratio	Export Ratio				
	•						
20	Food Processing	1-194	11-190				
21	Tobacco Manufactures 1/	14-182	8-74				
22	Textiles	70–189	1-181				
23	Textile Manufactures	8-192	39-192				
24	Lumber & Wood Products	12-181	16-142				
25	Furniture & Fixtures 2/	37	154				
26	Pulp, Paper & Paper Manufactures	104-183	4-187				
27	Printing and Publishing 3/	93-115	32-103				
28	Chemicals and Allied Products	16-185	19-191				
30	Rubber and Plastics Products 1/	9-139	55-140				
31	Leather Products	5-96	3-178				
32	Stone, Clay, and Glass Products	27-191	21-183				
33	Metals	28-174	5-168				
34	Fabricated Metal Products	23-190	36-139				
35	Nonelectrical Machinery	2-152	41-182				
36	Electrical Machinery	4-17-3	15-170				
37	Transport Equipment	10-120	25-194				
38	Precision Instruments & Equipment	21-163	10-155				
39	Miscellaneous Manufactures	38-180	2-185				
3,	111000110110000 110110110100100						

^{1/ 3} four-digit industries included in sample.

In tables 3, 4, and 5, the reader can compare the import and export position and performance of any four-digit industry with that of any other industry or of the group in general. As there are 194 industries in the sample, a rank, say, between 1 and 60 indicates above-average level or performance (heavy imports or strong exports); from 61 to 120 indicates average level or performance (moderate imports and exports); and 121 to 194 indicates below-average level or performance (minor import penetration or weak export activity). From the national, balance-of-payments point of view, "above-average" is "bad" in the case of

^{2/ 1} industry only in the SIC two-digit grouping.

^{3/ 2} four-digit industries included in sample.

imports and "good" for exports; "below-average" characterizes the least troublesome importers and the weakest contributors to exports.

Tables 7, 8, and 9 summarize the information contained in the rankings. Table 7 lists the rankings by deciles for imports relative to domestic shipments in 1968, arraying the number of industries appearing in each decile by broad, 2-digit SIC group. Table 8 does the same for exports. Finally, table 9 summarizes the data even further, into three groups corresponding closely to the "above-average," "average," and "below-average" classifications described above.

Tables 7 and 8 confirm that export and import experience are quite mixed within any broad industrial group. Most of the spaces in the bodies of these tables are filled in, indicating a fairly even spread of related industries across the spectrum of rankings. The same indication persists in the much wider rank classifications of table 9, for both import positions and export positions. However, the direct comparison of import and export positions made possible in this table does reveal some pattern of differences in performance on the import and export sides within broad industry groups. Textiles, wood products, leather products, metals, and miscellaneous manufactures, for example, appear as mainly heavy importers with fewer examples of strong export performance. Chemicals and the two machinery categories show a reverse pattern: considerably more industry branches with strong export positions than with heavy import positions. Despite these and other similar cases evident in the table, however, there remains a large number of cases in which broadly defined industries contain branches, more or less closely

Table 7.--The distribution of industries by 2-digit SIC class within deciles of the 194-industry rankings of imports relative to domestic shipments, 1968

SIC		Heavy import penetration	Mport	penet	ration	: Moderate	e import	1 1	penetration:	Minor	import		penetration	g			
class	: Description :	Rank	: Rank	ak :	Rank	Rank	: Rank	••	Rank :	Rank	Rank	1	Rank	l	Rank	Total	81
	•••	1-19	: 20-38	38	39-57	: 58-77	: 78-96	••	97-117 :	118-137	: 138-	156:	138-156:157-175		:176-194		
;	••		••	••		••	••	••	••			••				l	
70	: Food processing:	ო	. 2	••		٦ :	ო •	••	•	-		••	4	••	00	28	
21	: Tobacco manufactures:		••	••		н	••	••	••		••	••	_	••	-	· "	
22	: Textiles	Н	-		7	H	۳ :	••	••		7	••	-	••		14	
23	: Textile manufactures:		••	••		cı	••	••				••	-	•••	1	9	
77	: Wood products	Н	. 5	••		••	••	••			•	••	-	••			
25	: Furniture and fixtures:		••	••		••	H	••	••	•	,	••		••		T	_
26	: Pulp, paper, and paper :			••		••	••	••	••			••		••	,		
	: manufactures	-1	H	••		••	••	••	••			••	-	••	7		
27	: Printing and publishing:		••	••		••	H 	••	••			••		••		,	
8 2	: Chemicals and allied products -:		••	••	H	: 5	: 5	••	 E	ო	7	••		••	2	16	
႙	: Rubber and plastic products:	-1		••		••	••	••	••	7		••		••		<u>س</u>	
31	: Leather products:	H	: 2	••	ო	г :	••	••	••		н	••	·	••		∞.	
32	: Stone, clay, glass products:	7		••		: 2		••	••	-	_. س	••	7	••	-	17	
33	: Metala:	7	: 2	••	7	••	••	••			H	••	-	•••		100	-
34	: Fabricated metals		••	••	7		 	••		7	-	••	ო	••		11	
35	: Non-electrical machinery:	 1	••	••	~	4 :	ო ••	••		7	m	••	Н	••		. 18	
36	: Electrical machinery:			••		••		••	••	-		••		••			
37	: Transport equipment:	-	: 2	••		••	••	••	••	H	7	••		••	-	9	
88	: Precision instruments and :		••	••		••	•	••	••			••		••			
	: equipment:	- -1	: 2	••		н	-	••	•• ••			••		••		တ ••	
က	: Miscellaneous manufacturing:	ന	۲ :	••	4	. 5		••	••	7		••		••		13	
	•••		••	••		••	•	••	••			••		••			

Source: Table 3.

Table 8.--The distribution by 2-digit SIC class within deciles of the 194-industry rankings of exports relative to domestic shipments, 1968

STC			Strong	1g ex	exporter	ers	"	E	Moderate		exporters.	.8		Poor		export p	performers	mers			ŀ	ı
9 4 5	Description		Rank		Rank	Rank	놀.	Rank	동.	Rank	-	Rank	ļ	Rank		Rank	Rank	놈	Rank			
000			1-19	: 20	20-38	39-57	: 7:	58-77		78-96	•	97-117	: 1	118-137	: 13	138-156:157-175	:157-		:176-194	••	Total	1
••		••		••			••		••		••		••		••					••.		1
 20	Food processing	••	ო	••		. 5	••	7	••	7	••	H	••	4	••	7	: 2	••	7	••	28	
21	Tobacco manufactures	;	Н	••	-•		••	-	••		••		••		••		. 1	••		• •	ຕ	
22	Textiles	•		••	-•	••	••		••	7	••	2	••	7	••	-	: 2	••	.7	••	14	
23 :	Textile manufactures	••		••	••		••		••		••	-	••		••	-	7	••	5	••	9	
24 :	Wood products	••		••	,		••	7	••	-	••				••	ı	٦:	••	Н	••	'n	
25 :	Furniture and fixtures	••		••			••		••		••		•••		•••			•••		••	· ~	
26 :	Pulp, paper, and paper				•		••		••		••				••		· .	••		•		
••	manufactures	•••	-			H	••	Н	••		••	-	••		••	1		••		••	9	
27 :	Printing and publishing	••		••	••	-	••		••		••		••		••		T	••		••	7	
28 :	Chemicals and allied products-	••	e	••	3	m	••	က	••	7	••		••		••	—	••	••		••	16	
 90	Ruber and plastics	••		••	••		••		••				••					••		••		
••	manufactures	••		••	••		••	7	••		••		••		••			••		••	ന	
31	Leather products	••		••	••		••	Н	••		••		••	7	••	H	e.	••		.,	60	Τ
32 :	Stone, clay, glass products	••			••	7		ო	••	Н	••		••	7		7	: 2	••	4	••	17	33
33 :	Metals	••	٦	••	••	П	••		••	H	••	~ ~	••	ന	••	m		**	-	••	10	\$
34 :	Fabricated metals	••		••	••	7	••	-	••	ო	••	-	••	7			••	••	 1	••	Ħ	
35 :	Non-electrical machinery	••	က	Т	10 :	7	••	1	••	Н	••		••		••	,	••	••		••	18	
36 :	Electrical machinery	••	4	••	••	<u>س</u>	••	Н	••	•	••	5	••	-	••	-		. ••		••	19	
37 :	Transport equipment	••	7		••		••		••	-	••	-	••	-				••		••	9	
38	Precision instruments and	••		••	••		••		••		••		••		••		••	••		••		
••	equipment	••		••	3	7	••		••		••	-	••	~	••	H	••	••		••	œ	
39	Miscellaneous manufacturing	•••	-	••	2		••	7	••	-	••	7	••	-	••	2	.:	••		••	13	
••		••		••	••		••		••		••		••				••	••		••		1

Source: Table 4.

ole 9.--Import and export performances compared by 2-digit SIC class of industry and broad categories of activity, 1968

Source: Tables 7 and 8.

related, which are both strong importers and strong exporters (e.g. pulp and paper, or food processing). The same generalizations hold for the "moderate" and "weak" categories of performance. There are no clear patterns of specialization in either exports or imports when the data are aggregated to the two-digit industry level.

Determinants of the Commodity Composition of United States Foreign Trade

This section examines some of the factors underlying the pattern of U.S. trade. The analysis assumes that a strong export position for a U.S. industry reveals that its costs are low relative to costs in other countries, and that an improvement in the trade position of a U.S. industry indicates its costs have been declining relative to costs in other countries. The following characteristics to be examined are the essence of relative costs:

- 1. Capital per man
- 2. Labor intensity ratio
- 3. Wages per man
- 4. Labor skill ratio
- 5. Scale economies
- 6. First trade date (product age)
- 7. Product differentiation
- 8. Concentration ratio
- 9. Industry growth, 1958/60 to 1968

This melange of indicators will test a considerable number of theoretical hypotheses about the determinants of foreign trade patterns. Without essaying a full description of the older (static) and newer (dynamic) theories of comparative advantage, the paragraphs below provide a brief discussion of how each of these characteristics should be expected to influence an industry's foreign trade position.

- 1. Capital per man. --According to traditional theory, producers in a country which is relatively rich in a particular resource will have lower production costs than producers in other countries in those lines of production which use relatively large amounts of that resource. Under the assumption that markets will be dominated by the lower cost producers, a country can be expected to export those commodities which require in production relatively large amounts of that country's abundant factors of production. The United States has more capital per worker than any other country. Therefore, producers in the U.S. should have a cost advantage over producers in other countries in those activities which require a relatively high capital/labor ratio--and a cost disadvantage in industries that use relatively more labor than capital.
- 2. <u>Labor intensity ratio</u>.—This measure is an alternative to "capital per man" as an indicator of factor abundance. Industries in the U.S. which employ relatively less labor per unit of output should have relative cost advantages, and those which use labor more intensively in production should experience cost disadvantages and consequently poorer trade positions.

- Wages per man. -- "Human capital," a term referring to investments such as schooling and technical training, which make labor more productive, is a factor which recently has received much attention as a possible determinant of comparative costs. Available data indicate that the United States is also the richest country in the world in terms of human capital per worker. It is impossible, however, to quantify the concept of human capital and to devise a means for determining the amount used in each industry. Since it is not purchased and sold directly, as is physical capital, human capital does not have a directly obtainable market value. Instead, indirect or "proxy" measures must be used, and one of these is the average wage rate, by industry. As human capital is owned by the worker in whom it is invested, his wages will reflect not only the return on the "ordinary" service his labor supplies, but also the return on the human capital his skills and training represent. Thus, those industries in which education and specialized skills are essential will have high average wage rates. Average wage rates, by industry, can be interpreted as a proxy for rates of utilization of human capital.
- 4. <u>Labor skill ratio</u>.—Another proxy for human capital is the ratio of professional and technical manpower to total manpower used. Under the assumption that professional and technical manpower is more highly educated than other manpower, industries which have relatively high skill ratios will be those in which the ratio of human capital to ordinary labor in use is relatively high.

- 5. <u>Scale economies.</u>—The vast size of the domestic market in the United States, as well as relatively abundant supplies of both capital and labor for use in the production process, suggest that U.S. industries are well placed to exploit the economies of large scale production for the domestic market. Consequently, those industries in which relatively more scale economies are present should be those which enjoy the stronger trade positions, and conversely for those in which scale economies are less important.
- 6. First trade date (product age).—One of the newer theories of foreign trade begins with the reasonable premise that the U.S. economy is the world's most advanced economy, in terms of both the general level of technology employed and the sophistication of marketing techniques (including market research). As new products which are successful embody advanced technology and/or depend on effective marketing practices, many new products will be first developed and marketed in the United States. In the early stages of a product's life, uncertainty as to which product varieties will be accepted and which production techniques will prove most efficient will cause the developer to focus attention on the market most familiar to him—the domestic market.

When the product has been accepted domestically and economies of scale are exploited, domestic entrepreneurs will begin to seek out markets in other countries and exports of the product from the U.S. will begin. Foreign producers at first will not be able to compete with U.S. producers because they cannot "absorb" immediately the new technology needed to make the product. As time passes and techniques

accessible to foreigners. They begin to produce first for their own markets, and later the direction of trade gradually reverses. As the product becomes older it eventually becomes one which is imported by the United States rather than exported.

The "First trade date" series is a measure of the age of products entering into foreign trade. It is used below to test the hypothesis that U.S. exports are concentrated in industries that produce relatively new products.

- 7. Product differentiation.—Another theory assumes that because material resources are available to all countries at nearly uniform prices, rather similar industries tend to spring up in all industrial countries. These industries produce initially for their home markets. In an effort to expand sales, they attempt constantly to differentiate and diversify their product lines. It should be noted that "differentiation" can be either real or advertised in form. Sooner or later, producers reach the limits of domestic market potential and try moving into foreign markets, competing on the same basis, i.e. by offering "different" or "improved" products. Thus, trade should take place in those industries which produce more highly differentiated products, and there should be a tendency for exports and imports among industrial countries to be concentrated in the same rather than different industries.
- 8. Concentration ratio. -- In the section on measures of trade position (p.128), it was pointed out that the heaviest foreign traders in the U.S. economy appear to be the largest industries. In an economy

as large as that of the U.S., there is heavy concentration of output, employment, and sales among relatively small numbers of firms in the country's great manufacturing industries. Therefore, an examination of concentration ratios in relation to trade performance should indicate relatively strong trade positions for the more heavily concentrated industries, and conversely for those industries characterized by larger numbers of small firms relative to total turnover in their industries.

9. Industry growth. -- The combinations of characteristics -- capital intensity, labor skills, rates of new product development, etc. -- that make some industries more "competitive" than others in both the home and foreign markets, should lead to faster growth of output and sales for those industries. In that event, the fastest-growing U.S. industries should be the best performers in foreign trade; they should have the strongest export positions and the weakest import positions.

Method of comparison of industry characteristics

The interpretation of the results displayed in the tables supporting this section (tables 10, 11, and 12) can best be explained by an example illustrating how the tables were constructed. Assume that there were only two industries and that U.S. trade and domestic shipments were as follows:

Industry	Domestic shipments	Exports	Imports	Capital Per worker
A	\$100 mil.	\$10 mil.	\$20 mil.	\$2,000
В	200 mil.	30 mil.	20 mil.	1,000

Exports, in this example, total \$40 million, and a "typical" one-dollar basket of exports contains \$0.25 of A and \$0.75 of B; that is

Table 10.--The determinants of trade performance: Selected industry characteristics of imports 1/ compared with those of exports, 1958-60 (average) and 1968; characteristics of changes in imports compared with changes in exports, 1958-60 to 1968

(Percentages)

	• •		:	Characteristic
	: Character	istics of		of changes in
		elative		imports relati
Industry characteristic	: to ex	ports	:	to changes in
	:		:	exports
	: 1958-60	: 1968	:	1968
Capital per man	120.3	: 107.0	:	91.0
Labor intensity ratio	101.6	103.8	•	101.8
Wages per man (A)	95.3	97.3	:	100.4
Wages per man (B)	95.8	98.6	:	101.6
Labor skill ratio	64.9	: 75.3	;	104.4
Scale economies	69.8	103.0	:	93.2
First trade date	: 65.7	73.8	:	94.5
Product differentiation	82.5	89.2	;	104.5
Concentration ratio	95.3	102.6	:	98.9
Industry growth, 1958-60 to 1968	79.3	80.6	:	92.7

^{1/} Import replacements.

Source: See text of appendix.

le 11.--Selected industry characteristics of imports $\frac{1}{2}$ and of exports compared with the industry characteristics of domestic shipments, 1958-60 (average) and 1968

	(Percentages)			
••	1958-60		1968	58
Industry characteristic	: Imports relative :	Exports relative	Imports relative :	Exports relative
	to domestic :	to domestic :	to domestic :	to domestic
	shipments :	shipments	shipments	shipments
••	••			
ital per man:	139.6 :	116.0	125.0	116.9
or intensity ratio:	97.2	95.6	99.3	95.7
3s per man (A):	102.1	107.1	104.2	107.2
ss per man (B):	101.3	105.7	103.8	105.2
or skill ratio:	86.7	133.7	95.3	126.6
le economies:	67.8	97.0	95.6	
st trade date:	93.1	141.8	99.7	135.1
<pre>luct differentiation:</pre>	9.06	109.8	94.0	
:entration ratio:	108.0	113.4	113.7	110.8
stry growth, 1958-60 to 1968:	96.1	121.2	93.3	115.8
	••			

/ Import replacements.

ource: See text of appendix.

Table 12.--Industry characteristics of changes in imports $\underline{1}/$ and changes in exports compared with characteristics of changes in domestic shipments, 1958-60 (average) to 1968

	(Dama		
		changes)	01
			Changes of exports
Industry characteristic	•		relative to changes
	:	0- 00-00020	of domestic
	<u>:</u>	shipments	shipments
0	:		•
Capital per man	:	91.0	: 100.0
	:		:
Labor intensity ratio	:	102.5	: 100.7
	:		•
Wages per man (A)	:	98.9	98.6
	:		:
Wages per man (B)	:	99.9	98.4
	:		
Labor skill ratio	:	98.7	94.5
	:		
Scale economies	:	88.3	94.7
	•		
First trade date	:	93.4	98.8
	•	73.4	
Product differentiation		101.6	97.3
1 Oddot dilletentiation	•	101.0	97.3
Concentration ratio	•	98.4	
Concentration latin	;	70.4	99.5
Industry growth 1050 (0	•		
Industry growth, 1958-60	:		,
to 1968	:	91.8	99.1
b	:	:	

^{1/} Import replacements.

Source: See text of appendix.

it is made up, by value, of 1/4 of A and 3/4 of B. Of a "typical basket" of U.S. exports, 1/4 is produced using \$2,000 of capital per man and 3/4 is produced using \$1,000 of capital per man, so that the capital per worker employed in the production of a "typical basket" of U.S. exports is

$$(1/4)(\$2,000) + (3/4)(\$1,000) = \$1,250.$$

Next, a similar calculation is performed using the import data.

The resulting figure

$$(1/2)(\$2,000) + (1/2)(\$1,000) = \$1,500$$

is the amount of capital which would be employed per man in the production of a "typical basket" of U.S. imports, if these goods had been produced in the U.S. Because the data used in this study describe production conditions in the United States, the calculated factor refers to import replacements rather than to imports.

When the capital/labor ratios employed in producing import replacements (\$1,500) and exports (\$1,250) have been determined, the import replacements ratio is expressed as a percentage of the export ratio; these percentages are given in the tables, as in the first two columns of table 10.

In the example given above, a "typical bundle" of domestic output is composed one-third of A and two-thirds of B, so that the capital/labor ratio used in producing a "typical bundle" of domestic shipments is

$$(1/3)(\$2.000) + (2/3)(\$1,000) = \$1,333.$$

This figure can be compared with the input ratios used in producing typical bundles of exports and import replacements, to see how the

factor/characteristic contents of traded goods compare with domestically produced goods in general.

The tables contain characteristic content ratio comparisons for 1958/60 and 1968, although the underlying industry characteristics data apply only to a single year—usually the intermediate year, 1963. The calculations for the two different years were made from import, export, and domestic shipments data for the indicated year, and each set of calculations used the same intermediate year industry characteristic data. 1/ Accordingly, the changes in the resulting comparisons reflect only the changes in the composition of the patterns of imports, exports, and domestic shipments, and do not reflect any changes in production conditions which may have taken place.

Finally, similar calculations were made to compare the industry characteristics of typical bundles of "new" exports, "new" imports, and "new" domestic shipments—i.e. the industry characteristics of changes in these variables from 1958/60 to 1968. If, in the examples given above, Domestic Shipments, Exports, and Imports, by industry, are replaced by Change in Domestic Shipments, 1958/60 - 1968; Change in Exports, 1958/60-1968; and Change in Imports, 1958/60 -1968—all by industry—following the examples would illustrate the calculations given in table 12 and the third column of table 10.

¹/ Because of its large size, the package of industry characteristics data on which the results shown in tables 10-12 are based is not reproduced here. However, the characteristic series used are described in the Appendix, and the actual data are available on file in the Office of Economic Research, U.S. Tariff Commission.

Results of the calculations

Tables 10, 11, and 12 are constructed in such manner as to facilitate comparisons of the various industry characteristics studied, insofar as they affect imports, exports, and domestic shipments (and changes in these variables). The discussion which follows will consider each industry characteristic in turn, with all of the calculations for each characteristic pulled together from the tables into a text tabulation, as a means of giving a further basis for discussion.

1. <u>Capital per man</u>.--The relevant calculations for this variable are as follows:

Imports relative to exports, 1958/60	120.3
Imports relative to exports, 1968	107.0
Changes of imports relative to changes of exports	91.0
Imports relative to domestic shipments, 1958/60 .	139.6
Exports relative to domestic shipments, 1958/60	116.0
Imports relative to domestic shipments, 1968	125.0
Exports relative to domestic shipments, 1968	116.9
Changes in imports relative to changes in	
domestic shipments	91.0
Changes in exports relative to changes in	
domestic shipments	100.0

The first attempt to calculate the relative capital intensity of U.S. trade was made by W. Leontief for the years 1947 and 1951, and he found that a typical bundle of U.S. exports required less capital (both absolutely and relative to labor) than a typical bundle of U.S. imports (import replacements). 1/ This finding, the so-called "Leontief Paradox" spawned several similar studies, the most recent by

^{1/} W. Leontief, "Domestic Production and Foreign Trade: The American Capital Position Re-examined," Proceedings of the American Philosophical Society, v. 97 (1953), pp. 332-349.

R. E. Baldwin. \underline{I} / Almost without exception, these studies have reaffirmed the existence of the paradox that U.S. import replacements utilize a higher capital/labor ratio than U.S. exports.

The findings of the present study are consistent with Leontief's and subsequent work, although they contain evidence that "new" exports have tended to be more capital intensive than "new" imports. 1958/60 and 1968, the calculated capital intensity ratio for imports relative to exports was considerably greater than 100, although it dropped by about 10 percent in the intervening decade, from 120.3 to 107.0. This change is reflected consistently in the calculation for changes of imports relative to changes of exports; with a value of 91.0, this figure suggests that the capital intensity of "new" imports has been considerably less (about 10 percent) than that of "new" exports. ever, it appears that the change may have occurred mainly on the import side, probably through the entry of a considerably larger volume of labor-intensive imports. The calculations show imports as more capital intensive than domestic shipments in both years studied, but, here again, the ratio dropped between the two periods, from 139.6 in 1958/60 to 125.0 in 1968. The capital intensity ratio of exports relative to domestic shipments, however, barely changed, rising from 116.0 in 1958/60 to 116.9 in 1968. Finally, confirming this finding, the figure for changes in imports relative to changes in domestic shipments is 91.0, indicating that "new" imports have considerably less

^{1/} R.E. Baldwin, "Determinants of the Commodity Structure of U.S. Trade," American Economic Review, v. 61 (1971), pp. 126-146.

capital-intensive than "new" domestic shipments, whereas the analagous calculation for "new" exports vs. "new" domestic shipments is exactly 100, indicating virtually no change in the capital intensity of increases in exports as compared with increases in domestic output.

Note that the calculations show both exports and imports to be relatively more capital intensive than domestic production in general. This finding, too, is consistent with a main thread of evidence running through this study, namely that it is the larger, more highly-developed, and clearly more capital intensive industries which dominate both sides of foreign trade activity in the United States.

2. <u>Labor intensity ratio</u>.--The calculations for this industry characteristic turned out as follows:

Imports relative to exports, 1958/60	101.6
Imports relative to exports, 1968	103.8
Changes of imports relative to changes of exports	101.8
Imports relative to domestic shipments, 1958/60	97.2
Exports relative to domestic shipments, 1958/60	95.6
Imports relative to domestic shipments, 1968	99.3
Exports relative to domestic shipments, 1968	95.7
Changes in imports relative to changes in	
domestic shipments	102.5
Changes in exports relative to changes in	
domestic shipments	100.7

These results do not fully "match" those presented above for capital intensity, although the differences may be due entirely to the definitional differences between the Capital Per Man Series and the Labor Intensity Ratio. They are not really mirror images of one another. The capital per man series is a measure of capital input relative to labor input. The labor intensity ratio, on the other hand, ignores capital inputs altogether and merely measures labor input as a proportion of total production. Using this latter measure, we find

import replacements to have been slightly heavier users of labor than exports in both years, with the labor intensity of imports relative to exports increasing somewhat from 1958/60 to 1968. Thus, the evidence seems to show, taking both the capital/labor measure and the labor intensity measure together, that import replacements require heavier inputs of both capital and labor than do exports, even though there are differences in the ratios in which the two factors are used in import and export industries.

Both imports and exports clearly are less labor intensive than domestic production in general, a finding which is a fairly clear reflection of the previous finding that exports and imports also are more capital-intensive than general domestic production. Also, "new" imports over the period studied tended to be more labor intensive than both "new" domestic production and "new" exports, pointing up once again the labor-intensive character of the upsurge in imports that the U.S. has experienced in recent years.

3. Wages per man. -- As noted above, this variable is a "proxy" that purports to measure indirectly the amount of human capital embodied in production. Presumably, those industries with the higher average wage rates are those which employ the larger amounts of human capital in their production processes. Two separate series were available for this particular variable, and they were sufficiently different in coverage to warrant inclusion of both in the study as series "A" and "B." 1/ The relevant calculations were as follows:

 $[\]underline{1}$ / See text of Appendix for a full description of the differences between the two series.

	Series A	Series B
Imports relative to exports, 1958/60	95.3	95.8
Imports relative to exports, 1968	97.3	98.6
Changes in imports relative to changes		
in exports	100.4	101.6
Imports relative to domestic shipments 1958/60	102.1	101.3
Exports relative to domestic shipments 1958/60	107.1	105.7
Imports relative to domestic shipments 1968	104.2	103.8
Exports relative to domestic shipments 1968	107.2	105.2
Changes in imports relative to changes in domestic shipments	98.9	99.9
Changes in exports relative to changes in domestic shipments	98.6	98.4

These statistics reveal that wages tend to be slightly lower in import industries than in export industries, but that industries involved in international trade, either as exporters or as importers, tend to have higher wage rates than U.S. industries in general. This pattern of results may reflect the combined effects of the capital/labor ratio and the skill factor (human capital) on wage rates. Both export and import industries have been seen to have higher capital/labor ratios than the typical U.S. industry, and as higher labor productivity is associated with higher capital/labor ratios, this factor could account for the relatively high wage rates paid in trading industries. The higher ratio of skilled (and presumably more expensive) labor used in export industries (see below) could then account for the wage differential between export and import industries.

4. <u>Labor skill ratio</u>.--The results for this second proxy measure of human capital inputs in production were as follows:

Imports relative to exports, 1958/60	64.9
Imports relative to exports, 1968	75.3
Changes in imports relative to changes in exports	104.4
Imports relative to domestic shipments, 1958/60	86.7
Exports relative to domestic shipments, 1958/60	133.7
Imports relative to domestic shipments, 1968	95.3
Exports relative to domestic shipments, 1968	126.6
Changes in imports relative to changes in	
domestic shipments	98.7
Changes in exports relative to changes in	
domestic shipments	94.5

These results are clear-cut. Import replacements utilize a much lower skill ratio than exports, while the skill requirements for imports are lower, and those for exports higher, than the corresponding requirements for domestic production in general. As recently as 1968, these differentials remained significantly large--but there also is clear evidence that changes of trade patterns in roughly the previous decade showed an erosion of the strong competitive position of exports, based on human capital. Thus, the skill requirements for "new" imports turn out to have been higher than those for "new" exports, with the result that the skill ratio for imports relative to exports in 1968 was some 16 percent higher than the same ratio in 1958/60. While both "new" imports and "new" exports had lower skill ratios than "new" domestic shipments, the figure for "new" exports is much lower, indicating that the high-technology products embodying large amounts of human capital did not keep the same pace in export markets as in the domestic market. In other words, the labor skill advantage of U.S. products, while still clearly an important determinant of trade

performance, tended to show a slower pace of transformation into new exports, while the proportion of imports with high skill ratios tended to increase. Thus, these changes do not reflect inadequate performance of the U.S. economy, but reflect (1) the very rapid growth of the human capital endowments of the industrial economies which are the United States' principal competitors and partners in foreign trade, and (2) failure of U.S. industry to export products embodying the highest levels of labor skill.

5. <u>Scale economies</u>.—The calculations of trade performance with respect to this industry characteristic were as follows:

Imports relative to exports, 1958/60	69.8
Imports relative to exports, 1968	103.0
Changes in imports relative to changes in exports	93.2
Imports relative to domestic shipments, 1958/60	67.8
Exports relative to domestic shipments, 1958/60	97.0
Imports relative to domestic shipments, 1968	95.6
Exports relative to domestic shipments, 1968	92.8
Changes in imports relative to changes in	
domestic shipments	88.3
Changes in exports relative to changes in	
domestic shipments	94.7

In 1958/60, the index of scale economies was much higher for export industries than for import replacement industries, an observation consistent with the hypothesis that U.S. comparative advantage rested in significant part on the ability of U.S. industry to exploit economies of mass production. However, the relationship between import replacements and exports as regards scale economies virtually reversed itself by 1968, when the index became slightly higher for import replacements than for exports. A similar shift appears in the calculations for imports and exports relative to domestic shipments

in the two periods. In 1958/60 import replacements were considerably less dependent on scale economies, with exports only slightly less dependent, than the products of U.S. industry in general. By 1968, the indexes of scale economies for import replacements and domestic shipments had moved much closer to equality, whereas the ratio for exports relative to domestic shipments had fallen slightly—to a level below that for imports relative to domestic output.

This evidence points fairly clearly toward the conclusion that the existence of scale economies is rapidly losing its favorable influence over U.S. trade performance. The rapid development and growth of other industrial countries—most of which serve worldwide, rather than local markets—have permitted industries in these countries to exploit the economies of mass production almost as fully as their counterparts in the U.S. The result has been a significant increase in U.S. imports of goods which depend heavily on economies of scale in production, while U.S. products of the same type find increasing competitive resistance in export markets from similar goods produced abroad.

6. First trade date. -- This series measures, in an indirect way, the average age of the product line produced by an industry. The series underlying the calculations indicates the year in which the industry's product line first entered international trade (or became significant enough to be separately entered in official statistics); hence, a low number indicates a relatively old product line. The results of the calculations were as follows:

Imports relative to exports, 1958/60	65.7
Imports relative to exports, 1968	73.8
Changes in imports relative to changes in exports	94.5
Imports relative to domestic shipments, 1958/60	93.1
Exports relative to domestic shipments, 1958/60	141.8
Imports relative to domestic shipments, 1968	99.7
Exports relative to domestic shipments, 1968	135.1
Changes in imports relative to changes in	
domestic shipments	93.4
Changes in exports relative to changes in	
domestic shipments	98.8

The calculations indicate that imports are more concentrated in industries with relatively old product lines than are exports, although, here again, shifts in trading patterns tended at least somewhat to increase the weight of new products in imports during the decade under review. The figures on exports relative to domestic shipments clearly support the hypothesis that U.S. exports tend to emphasize new product lines in U.S. industry; exported goods continue to be much newer products than the average for domestic shipments in general. Yet, especially in 1968, the product age of import replacements showed little variation from the age of general domestic output, indicating that foreign exporters are sending to the U.S. products about equally as "new" as the average item sold in the domestic market.

7. Product differentiation. -- Comparisons of the indexes of product differentiation for exports, import replacements, and domestic shipments produced the following figures:

Imports relative to exports, 19	58/60 82.5
Imports relative to exports, 19	
Changes in imports relative to	
Imports relative to domestic sh	
Exports relative to domestic sh	
Imports relative to domestic sh	
Exports relative to domestic sh	
Changes in imports relative to	changes in
domestic shipments	101.6
Changes in exports relative to	changes in
domestic shipments	97.3

These results are clear-cut and consistent. They show that export industries tend to have more highly differentiated product lines than imports, with general domestic production falling between the two. Thus, the data furnish support for the view that the U.S. should have the strongest position in world markets in those industries characterized by competition in the form of innovation and product development—industries which should have the most diversified product lines. Moreover, if industries with the most diverse product lines also have the newest product lines (cf.the discussion immediately preceding on product age as a characteristic of traded goods), then these results also furnish additional confirmation of the view that a steady flow of new products is an important positive factor in U.S. trade performance.

As in the cases of many of the industry characteristics studied here, however, the calculations show a clear tendency for some erosion of the beneficial influence of product differentiation to have taken

place. From 1958/60 to 1968, changes in imports showed greater product differentiation than did changes in exports, while changes in imports were similarly related to changes in domestic shipments, and changes in exports showed slightly <u>less</u> product differentiation than changes in domestic shipments as a whole. The appropriate conclusion from these indications is that the lion's share of the structural change appears to have taken place on the import side. Foreign producers appear to have had considerable success in penetrating the U.S. market with a form of competition—product differentiation—which in the late 1950's was practically a prerogative of U.S. industries.

8. Concentration ratio. -- The calculations for this industry characteristic were as follows:

Imports relative to exports, 1958/60	95.3
Imports relative to exports, 1968	102.6
Changes in imports relative to changes in exports	98.9
Imports relative to domestic shipments, 1958/60	108.0
Exports relative to domestic shipments, 1958/60	113.4
Imports relative to domestic shipments, 1968	113.7
Exports relative to domestic shipments, 1968	110.8
Changes in imports relative to changes in	
domestic shipments	98.4
Changes in exports relative to changes in	
domestic shipments	99.5

For 1958/60, the calculations indicate that exports were drawn to a greater extent than imports from the more concentrated industries. By 1968, this relationship was reversed, with the import industries showing a higher degree of concentration than the export industries. Yet further calculations indicate that all industries which engage in international trade, either as exporters or as importers, tend to be more concentrated than the "typical" U.S. industry, although the "gap" for the export industries tended to decline from 1958/60 while that

for the import industries widened relative to domestic industry as a whole. The indication of higher degrees of concentration in industries most heavily engaged in trade probably reflects the generally larger scale of operations in international transactions as compared with domestic transactions. This prevents industries characterized by many, relatively small firms from engaging in international commerce to the same extent as those industries made up of a few large firms—and this, in turn, is a reflection of the lack of institutional arrangements in the U.S. (as contrasted with, say Japan) for mobilizing small firms to operate in the foreign sector.

9. <u>Industry growth, 1958/60 to 1968</u>.--For this last of the industry characteristics studied, the calculations yielded these results:

Imports relative to exports, 1958/60	79.3
Imports relative to exports, 1968	80.6
Changes in imports relative to changes in exports	92.7
Imports relative to domestic shipments, 1958/60	96.1
Exports relative to domestic shipments, 1958/60	121.2
Imports relative to domestic shipments, 1968	93.3
Exports relative to domestic shipments, 1968	115.8
Changes in imports relative to changes in	
domestic shipments	91.8
Changes in exports relative to changes in	
domestic shipments	99.1

Industry growth is measured here by the percentage increase in gross sales over the period. As such, it is not an industrial "characteristic" but rather the result of the operation of the combinations of factors or characteristics which conspire to make some industries more dynamic than others. The calculated statistics indicate that imports tend rather strongly to be concentrated in the slower-growing, less dynamic industries, whereas exports are heavily concentrated in the fast-growing branches of manufacturing. In the

case of imports, cases can be cited (textiles, for example) in which the presence of increasing imports obviously has placed a constraint upon the growth of the relevant domestic industry, although there are other instances (in some resource-oriented industries, for example) in which the domestic industry traditionally has been weak relative to the competition of cheaper and/or superior foreign products. U.S. exports, however, are almost always the result of "spillover" effects. There are few U.S. industries whose growth can be characterized as export-led, in the sense that exports have not only accounted for a large proportion of output but have provided the chief source of demand for the products involved. Rapid growth rates in U.S. industries tend rather to result from successful marketing at home, with export sales taking the form of a natural extension of this marketing process. Thus, the favorable export performance of the more dynamic industries attests to the key roll of the large and well-developed U.S. domestic market in permitting new lines of activity to gain productive and marketing strength.

One would expect that economies of scale should play an important role in this process. However, the analysis of this characteristic conducted above (p.152-153) indicated that the role of scale economies in producing comparative advantage for the United States in international trade has diminished considerably. The enjoyment of economies of scale is apparently a necessary but not sufficient condition for the generation of a comparative advantage in international trade. Older industries, with older and less diversified product lines, less advanced technology, and less opportunity to employ highly skilled labor

find the presence of scale economies in the domestic market to be of little benefit in foreign markets and in the struggle against competing imports at home. On the other hand, the more dynamic industries, which produce highly differentiated lines of new products, using advanced technologies and heavy inputs of skilled labor or "human capital", are those which, on the basis of the evidence examined here, are in the best position to take advantage of scale economies to compete successfully against foreign producers, both at home and abroad.

Summary Interpretation of the Importance of the Industry Characteristics

U.S. exports appear to be concentrated in industries with large, diverse product lines, which are experiencing the most rapid growth in the domestic market and enjoy scale economies recently achieved. Economies of scale achieved in the past and not accompanied by recent rapid domestic market growth do not appear to have much beneficial effect on trade performance. The importance of skilled labor and "human capital" in general as a factor in trade competitiveness is also pointed up by the findings.

The analysis of changes in trade performance from 1958/60 to 1968 reveals a general weakening of the influence of most of the characteristics that in the past have contributed to U.S. comparative advantage. "New" imports are increasingly characterized by their need for skilled labor, by a decline in average product age, by an increase in product differentiation, and by a dependence on scale economies and industrial concentration. "New" exports, on the other hand, in general enjoy these advantages to a relatively lesser extent than in the past.

The explanation for these adverse changes may be traceable in part to the character of industrial development abroad. With postwar reconstruction essentially completed more than two decades ago, the economies of Western Europe and Japan—the United States' chief trading partners and competitors—have since developed rapidly their physical capital, human capital, and marketing skills, which has facilitated competition with U.S. industries in their own markets.

However, other evidence suggests that this probably is not the entire explanation. First, as discussed on p.129 above, a study of the several measures of trade performance indicates that the changes which occurred from 1958/60 to 1968 can be described more closely as changes within the pattern of trade rather than as changes of the pattern itself. If the 194 industries in the sample used for this study are arrayed and ranked according to trade performance, the ranked arrays show relatively little change over the period considered. The weakened trade performance of the late 1960's shows up instead as a tendency for the entire array to import more and/or export less.

Secondly, the abruptness of the observed shifts in the trade positions of U.S. industries after about 1966 seems somewhat inconsistent with the gradualness with which one would expect deep structural changes to take place.

At this point, therefore, it is appropriate to recall the evidence brought forth in Part I of this Study--namely that inflationary developments had the effect of shifting the cost structure of U.S. industry in

general upward relative to costs abroad. The impact of inflationary movements of costs and prices is spread across the entire spectrum of industrial activity, which would account for the general deterioration of U.S. trade in industrial goods, as well as for the abruptness of the change, which was coincident with the period of most rapid escalation of costs and prices. However, not all industries were equally affected in terms of trade performance. Those whose trade positions were marginal--i.e., those whose costs were relatively close to those abroad in 1958/60--suffered relatively more erosion of their trade positions by 1968 than did those industries whose cost advantages over foreign producers initially were large enough to absorb inflationary developments without as much erosion of their trade positions. These unequal reactions to inflation can account for some of the observed shifts in industry rankings. Other shifts are attributable to the increased acquisition by foreign economies of those industry characteristics that U.S. industries possessed in relatively greater abundance in the late 1950's and early 1960's.

Moreover, the inflation in the U.S. may have affected some of the calculations used to measure the characteristics-content of U.S. trade. The computations used to obtain the various ratios studied were essentially weighted averages of the characteristic contents of the 194 industries, with exports, imports, and domestic shipments (as well as changes in these variables) used as weights. The current-price values used for these variables embody the effects of inflation.

Perhaps the most balanced interpretation of all the evidence un-

which determine U.S. trade performance furnish a good basic explanation for U.S. trade patterns but they have not, in general, led to everwhelming differences in costs relative to foreign industries; and (2) shifts in comparative advantage—and therefore in the trade positions of U.S. industries—can be induced by brief but heavy doses of domestic inflation in the United States. It is probable that in the second half of the 1960's, inflation was the proximate cause of the observed deterioration in the trade positions in many U.S. industries

NOTE: See Appendix at the end of this report for a full description of the sources of data and operational definitions of the variables employed so far in this part of the Study.

Multinational Enterprise and U.S. Trade Performance

The rapid growth of multinational business in recent years is not by itself a "determinant" of trade patterns in the same sense as a country's endowments of natural resources, capital, and labor, or as the dynamic forces of domestic economic development. It falls more naturally into the category of institutional factors which shape the pattern of Nevertheless, the now enormous worldwide network of multinational businesses characterized by heavy direct investment in manufacturing facilities outside their countries of origin and incorporation has greatly affected trade flows. Because U.S. firms have been in the vanguard of the spread of multinational business since the end of World War II, serious and crucial questions have been raised concerning the influence of their international operations on U.S. exports and imports. In the context of the general subject of the competitiveness of American manufacturing industry, critics of the spread of multinational business have raised a fairly complex hypothesis, which can be summarized briefly as follows:

- a. Foreign direct investment by U.S. firms tends at least partially to replace manufacturing plants that would otherwise have been located inside the United States;
- b. This shift in the locus of production tends to reduce foreign demand for U.S. exports of manufactured goods, which can now be purchased locally or imported from nearby countries, from factories owned and operated by U.S. parent firms;
- c. The effect on U.S. imports is equally perverse, as parent companies in the United States import growing quantities of

components and finished goods produced at lower cost abroad.

This section will attempt to examine and evaluate the foregoing hypothesis in light of available evidence, which is rather meager at this time and requires inferential rather than direct conclusions. After a brief background sketch of the scope of American firms' penetration—and virtual domination—of transnational business life, the discussion will focus on the problem of their impact on U.S. foreign trade. Other key topics, such as the effect of multinational enterprise on labor, will not be considered here as they are peripheral to the major subject of this Study, namely U.S. trade competitiveness.

The Growth and Distribution of Foreign Direct Investment by U.S. Firms, 1960-1970

The net book value of U.S. direct foreign investment has grown continuously and rapidly in the last decade, more than doubling from \$31.9 billion in 1960 to \$78.1 billion in 1970 (table 13). Manufacturing accounts for the largest share of this investment (41 percent in 1970), and it has shown the fastest growth rate of all types of U.S. enterprise abroad, having almost tripled from \$11.1 billion in 1960 to \$32.2 billion in 1970.

In 1969, Europe surpassed Canada for the first time as the main recipient of U.S. direct investment (table 14), and its position was solidified as the favorite area for U.S. direct investors in 1970. The growth of U.S. investment in Europe has exceeded that of all other areas by far since 1960. In that year, Americans controlled some \$6.7 billion in assets in Europe, compared with \$11.2 billion in Canada and \$14.0 billion in the rest of the world. By 1968, holdings in Europe had leaped

Table 13.--U.S. Direct Investment Abroad by Industry, 1960-70

			(Book value at yearend, in millions of dollars)	ie at yea	rend, in 1	nillions (of dollars	3)			
Industry	1960	1961	1962	1963	1964	1965	1966	1961	1968	1969	1970 1/
: dining and		•• ••	••••					••••			
smelting:	2,997	3,094	3,244	3,419	3,665	3,931	4,365	. 4,876	5,435:	5,658	6,137
etroleum	10,810	10,810 : 12,190 : 12,725	12,725	13,652	14,328	15,298	16,222	17,399	18,887	19,882	21,790
lanufacturing: 11,051 : 11,997 : 13,250	11,051	: 11,997	13,250	14,937	16,935	19,339	22,078	24,172	26,414	29,527	32,231
ther	7,007	7,007: 7,436: 8,057	8,057	8,728	9,552	10,906	12,134	8,728 : 9,552 : 10,906 : 12,134 : 13,044 : 14,248 : 15,948 : 17,932	14,248	15,948	1
Tota1	31,865	31,865 ; 34,717 ; 37,276		40,736	44,480	46,474	54,799	. 40,736 · 44,480 · 49,474 · 54,799 · 59,491 · 64,983 · 71,015 · 78,090	64,983	71,015	78,090

 $\frac{1}{2}$ / 1970 data are preliminary.

Source: Compiled from the Survey of Current Business, Dept. of Commerce, October 1970 and October 1971.

Table 14. -- Selected Data on U.S. Direct Investments Abroad, by Major Areas, 1960-70

	1970 1/	22,801 24,471 1,491 4,348 14,683 10,296 78,090	
	1969	21,127 21,650: 1,244: 3,865: 13,841: 9,288: 71,015:	
	1968	19,535: 19,407: 1,050: 3,508: 1e,101: 8,383: 64,983:	
	1967	18,102 17,926 870 3,172 12,049 7,372 59,491	
f dollars	1966	17,017 : 16,234 : 756 : 2,655 : 2,655 : 6,640 : 54,799 :	
111ions o	1965	15,318 : 13,985 : 675 : 2,334 : 6,276 : 6,276 : 6,474 :	
(Book value at yearend, in millions of dollars	1964	13,855 : 12,129 : 598 : 2,053 : 2,053 : 5,591 : 44,480 : :	
e at year	1963	13,044 : 10,340 : 472 : 1,783 : 5,941 : 5,156 : 40,736 : :	
3ook valu	1962	12,133 : 8,930 : 373 : 1,539 : 6,524 : 4,777 : 37,276 : 5	
. .	1961	11,179 : 11,602 : 12,133 6,691 : 7,742 : 8,930 254 : 302 : 373 1,195 : 1,331 : 1,539 8,365 : 9,239 : 9,524 4,181 : 4,501 : 4,777 31,865 : 34,717 : 37,276	
	1960	11,179 : 6,691 : 254 : 1,195 : 8,365 : 4,181 : 31,865 :	
	Area	Canada: Europe: Japan: Australia, New : Zealand and South Africa: Latin American Republics and other Western Hemisphere: Total:	•

1/ 1970 data are preliminary.

Source: Compiled from the Survey of Current Business, U.S. Dept. of Commerce, October 1970 and October 1971.

Canadian assets that year, while direct investment in the rest of the world had grown to \$26.0 billion. In 1970, the total for Europe rose to \$24.5 billion—3.7 times its level in 1960—with Canada accounting for \$22.8 billion and the rest of the world for \$30.8 billion. Thus, although U.S. direct investment holdings are well distributed throughout the Free World, they have tended, especially in recent years, to concentrate in the industrial countries—where production conditions are more or less comparable to those in the U.S., skilled labor is available, and, perhaps most important, affluent markets can be tapped. The one exception to this pronounced locational feature is Japan, which has quite successfully restricted inflows of foreign direct investment in productive facilities. In 1970, U.S. direct investors' penetration of the Japanese economy amounted to a mere \$1.5 billion, or 1.9 percent of the total book value of American direct investment abroad.

Earnings on Direct Investments

U.S. firms' earnings on total direct investments abroad increased steadily from \$3.6 billion in 1960 to \$8.7 billion in 1970. This rise paralleled almost exactly the increase in book value of the underlying investments, as returns on book value remained remarkably stable at an average of 11.0 percent, with variations of no more than 1 percent in either direction. Income transfers to the United States, which are estimated in column 4 of table 15, are roughly equal to annual increases in total book value of the investment on which they are based, and they

Table 15.--Returns on U.S. Direct Investments Abroad, 1960-1970

••		: Earnings	1/	Tra	Transfers to U.S.	2/
Year :	BOOK Value	+ 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Percent of	Amoint	: Percent of	: Percent of
••	ar yearend	יייייייייייייייייייייייייייייייייייייי	book value	:	: book value	: earnings
	Millions of	: Millions of :		: Millions of	••	••
••	dollars	: dollars :		: dollars	••	••
••		••		••	••	••
1960	31,865	3,566:	11.2	: 2,355	7.4	0.99 :
1961	34,717	3,815:	11.0	2,768	8.0	: 72.6
1962:	37,276	4,235	11.4	3,044	••	: 71.9
1963	40,736	4,587	11.3	3,129	••	•
1964	44,480	5.071	11.4	3,674	. 8.3	: 72.4
1965	49,475	5,460 :	11.0	: 3,963	. 8.0	: 72.6
•	•			••	••	•6
	662.75	5.702	10.4	4,045	. 7.4	5.07
1967	50 401	6.034	10,1	4,518	. 7.6	•
1068	64, 983	7.022	10.8	: 4,973	: 7.7	: 70.8
1969	71,016	8,123	11.4	5,658	. 8.0	: 69.7
1970 3/	78,090	8,733 :	11.2	6,026	: 7.7	. 69.0
1 2 3 3 4			11.0		7.8	. 70.8
werage retuins		• ••		•	•	••
•					•	

1/ Net earnings of foreign corporations plus net earnings of foreign branches. 2/ Includes net earnings of foreign branches, dividends on common stock, preferred dividends, and interest, all net after withholding taxes, all before U.S. taxes.

 $\frac{3}{4}$ 1970 data are preliminary.

Source: Compiled from the Survey of Current Business, U.S. Dept. of Commerce, October 1970 and October 1971. probably exceed considerably the annual balance of payments outflow on direct investment account because a considerable portion of U.S. foreign direct investments now are financed abroad, in the Eurocurrency markets.

The Influence of Multinational Activity on U.S. Trade

A meaningful analysis of the foreign trade performance of U.S.-owned multinational firms requires a collection of data on both foreign investment and trade that can be broken down on an industry-by industry basis, thus permitting comparison of the multinationals' activity in each industry with the performance of the industry as a whole. Such data are sparse and incomplete, especially as regards foreign investment, but enough information is available to permit a preliminary analysis.

The information summarized in table 16 consists of 22 basic data sets, covering the twenty industries described by the U.S. Standard Industrial Classification (SIC) code at the two digit level (items 20-39 for manufacturing). There are two groupings further broken apart to show beverages as distinct from food products and motor vehicles separately from all other transportation equipment. For each data set (industry), the following information is included:

(1) A measure of cumulative foreign investment in fiscal year 1970 (column 1 in table 16). Unfortunately, this series does not represent total book value of productive assets, which is not available in sufficient detail by industries. It is a series furnished by the Internal Revenue Service, measuring only the value of equity holdings by U.S. firms in foreign enterprises in FY 1970. Since the amount of stock ownership in an enterprise (and its valuation) do not accurately measure

Table 16, -- Foreign and domestic investment and foregign-trade performance of 22 U.S. industries

		Foreten	Domestic			Share	of 1968	Change in	Change In
SIC	Industry description	Invest-	invest- ment 2/	Exports,	Imports,	domestic	"market" $3/$	share of	tatio of
Code		ment 1/ :	CY 1961-	CY 1969	CY 1969	2		domestic :	exports 4/
			CY 1968			E TOO WE	· salodar ·	1961-1968	1961-1966
	FORM WINDS AND THE STREET OF THE PROPERTY OF AND THE STREET OF THE STREE	: Million :		: Million	Million				
		dollars :		: dollars	dollars	Percent	: Percent :	Percent	
70 2/	Beverages	235 :	1,169.4	: 28.3	619.7	0.42	10.3	25.6	0.552
20 27	: Food and kindred products	: 1,174 :		: 2,174.4	2,505.5	2.61	: 2.9 :	26.1	1.191
21	: Tobacco manufactures	: 132 :	326.7	: 155.5	12.0	4.54	: 0.4 :	100.0	1.791
23	: Textile will products	: 492 :	4,290.2	: 418.0	970.4	1.70	. 5.8 :	9	1,224
23	: Apparel and other finished textile products	: 147 :	1,523.4	: 222.0	1,148.6	. 0.83	: 4.7 :	113.6	3.477
24	: Lumber and wood products (excl. furniture)	: 639 :	3,215.4	: 612.6	1,162.4	3.95	. 8.8	22.2	0.653
23	Furniture and fixtures	: 61 :	1,212.6	51.9	229.8	4.54	: 0.4 :	200.0	6,049
26	: Paper and allied products	: 703 :	8,373.1	885.8	1,558.6	3.51	: 9.9 :	-12.0	0.753
27	: Printing, Publishing, and related industries	: 142 :	4,634.9	: 319.5	136.5	1.30	: 0.5 :	66.7	1.452
28	: Chemicals and allied products	2,799 :	17,399.9	: 3,513.3	I,067.4	. 7.38	2.6:	73.2	1.520
53	: Petroleum refining and related industries	2,068	5,138.3	501.6	1,297.4	2.16	: 5.8 :	23.4	1.768
œ	: Rubber and miscellaneous plastics	. 044	3,900.0	333.6	384.5	2.16	3.5 :	75.0	1.796
31	: Leather and leather products	: 97	391.4	67.9	603.2	1.16	10.0 :	156.4	4.253
33	s Stone, clay, and glass products	539	5,850.9	: 402.8	510.5	2.19	3.6 :	33.3	1.180
33	: Primary metalor	: 504	16,916.0	: 1,298.1	3,514.1	2.56	. 8.9	93.5	1.349
76	: Fabricated metalgamentamentamentamentamentamentaments	538	6,148.2	: 1,307.7	663.0	3.27	1.9:	111.1	1.579
35	: Nonelectrical machinery	3,179	9,764.1	: 6,722.0	1,969.1	: 12.48	: 4.4 :	109.5	2.363
36	: Electrical machinery and equipment	1,645	8,101.4	: 2,706.8	2,235.9	4.84	: 4.3 :	138.9	2.473
37 5/	: Transport aquipment (excl. motor vehicles)	: 159	: 10,958.8	2,305.2	. 703.0	8.09	2.5 :	108.3	2.089
37.5/	: Motor vehicles and equipment	1,395	: 6,610.5	: 3,484.7	: 4,931.6	5.93	. 9.5	459.8	4,624
33	: Professional, scientific, and control instruments	452 :	: 1,971.6	: 1,140.8	574.7	: 9.83	: 0.9 :	328.6	1.323
86	: Miscellaneous manufacturing	: 277 :	1,259.9	: 905.2	1,033.9	8.72	: 12.2 :	67.1	0.649
		••		••		•	•		

Total equity ownership in foreign establishments.
 Cumulative actual capital outlays for plant and equipment, not adjusted for depreciation.
 Cumulative actual capital outlays for plant and equipment, not adjusted for depreciation.
 Domestic "market" (actually domestic purchases) defined as in value of domestic factory shipments, plus imports to exports for 1969 divided by ratio of imports to exports in 1961.
 Part of group.
 Negligible.

Source: Foreign investment data from IRS as supplied by firms on U.S. Information Return, Form 959. All other data from Trade Relations Council of the United States, Inc., Employment, Output, and Foreign Trade of U.S. Manufacturing Industries, 1958-68/69, 3d ed. 1971.

the value of plant and equipment actually controlled in most cases, these data greatly understate levels of foreign investment. Thus, the total of equity holdings for the industries shown is \$17.8 billion, which is only about 60 percent of the comparable total of \$30.8 billion in book value reported by the Department of Commerce, adjusted roughly to correspond with the fiscal year time frame of the IRS figures. This understatement is not a fatal deficiency, however, given the uses to which the data have been put. The 22 industries concerned have been compared basically in terms of their rankings on the basis of investment and trade performance--a technique which partly or largely reduces the problems posed by inaccuracies in absolute values. The analysis which follows still requires an assumption that equity holdings are roughly proportional to total investment--i.e., that industries which rank high in terms of equity ownership also rank high in terms of cumulative capital outlays, with low- and intermediately-ranked industries similarly related. Fortunately, there can be some variation in the degree of proportionality without any serious distortion of the results.

- (2) The second column of table 16 contains a comparable, although not identical, series on domestic investment in each industry. It measures cumulative domestic capital spending in each industry (not adjusted for depreciation) for the period 1961-68.
- (3) The next four columns (3 through 6) are measures of the <u>levels</u> of trade in each industry in recent years. Columns 3 and 4 show exports and imports, respectively, in calendar 1969, while columns 5 and 6 relate exports and imports in 1968 to a measure of the U.S. domestic market for

the products of each industry.

(4) Columns 7 and 8 contain measures of <u>changes</u> in trade patterns in the 22 industries during the 1960's. Column 7 shows percentage changes in imports' share of the domestic market from 1961 through 1968, while column 8 represents the ratio obtained by dividing the ratio of imports to exports in 1969 by that for 1961.

Taken together, these data permit comparisons of the 22 industries' positions as foreign investors with (a) their domestic investment performance, (b) their contributions to levels of trade in recent years, and (c) their influence on changes which took place in the patterns of U.S. trade in manufactured goods during the 1960's. The results of these comparisons are summarized in table 17. The principal analytical technique employed was to arrange the data in each column of table 16 such that the 22 industries ranked from highest to lowest, and then to compare the rankings in columns 2 through 8, successively, with those in the first column (foreign investment position). The resulting statistic from such a comparison is a coefficient of "rank correlation", which can vary from a value of 1.0 (signifying perfect correspondence of the rankings) to -1.0 (a perfect inverse correspondence). Two measures are shown: the "Spearman" coefficient, which is commonly used and easy to calculate; and the "Kendall" coefficient, which tends to produce more accurate measures for data groupings like the one at hand which have less than 25 or 30 observations. Ordinary linear correlations were also tried, using the observed values rather than rankings, and it is interesting to note that the results were not much different from the rank correlations--suggesting that the series

Table 17.--Correlations of Domestic Investment and Various Measures of Trade Performance with Investment Activity for Twenty-Two U.S. Manufacturing Industries $\underline{1}/$

		. Coefficient of rank	of rank	Coefficient
Variable correlated with foreign : investment in FY 1970	Industries analyzed	correlation	tion :	of linear
		: Spearman :	Kendall:	correlation
: Domestic investment, 1961-68:	All 22 industries 20 industries $\frac{2}{}$	0.732* : 0.708* :	0.541* :	0.565* 0.594*
Exports, 1969:	All 22 industries 20 industries $\frac{2}{}$	0.757*:	0.602*: 0.632*:	0.803* 0.890*
Imports, 1969	All 22 industries 20 industries 2/	. 0.687* : 0.642* :	0.498*:	0.406
Exports as percent of domestic "Market" in 1968	All 22 industries 20 industries $\frac{2}{}$	0.488**:	0.382**:	0.510**
Imports' share of domestic : "Market" in 1968:	All 22 industries 20 industries $\underline{2}/$	0.106 :: -0.002 ::	0.078 : 0.011 :	-0.085 -0.164
Percent change in imports' "Market" share, 1961-68	All 22 industries 19 industries $\frac{3}{}$	-0.228	-0.169 -0.404**:	-0.020
Change in ratio of imports to exports, 1961-69	All 22 industries 19 industries $\frac{3}{}$	0.144 : -0.488**:	-0.108 -0.333**:	-0.039 -0.255
		אַרָּנָייִ אַרָּנָיִייִ אַרָּנָייִייִּ	o and for	

1/ Based on data in table 16, page 170. See that table for industry definitions and for definition and explanation of the data series used.

 $\frac{2}{3}$ Excludes petroleum refining and tobacco manufactures. $\frac{2}{3}$ Excludes motor vehicles and both electrical and nonelectrical machinery.

Note. -- * Significant at 1 percent.

on equity investment abroad may indeed be a better-than-expected substitute for presently unavailable book-value figures.

1. Foreign vs. domestic investment performance

The data indicate that, on an industry-by industry basis, the most active foreign investors also tend to be the heaviest domestic investors in the U.S. economy. Both the rank and linear correlations between foreign and domestic investment activity are fairly strong and statistically highly significant. While these results do not "prove" that high levels of foreign direct investment have not tended to depress capital outlays in the same industries in the U.S., they do show that industries in the top ranks of the foreign investors have retained a similar position in the domestic economy—and that industries which have not taken investment funds abroad have been similarly laggard in their investment performance at home relative to other manufacturing industries.

2. Association between foreign investment and levels of trade

The strong and statistically highly significant rank and linear correlations between 1969 exports and levels of foreign investment suggest that the U.S. industries most active in production abroad also are the heaviest contributors to U.S. exports, while the least important foreign investors show a weaker impact on exports. There is a similar relationship with respect to 1969 imports, although the correlations are less strong and the linear measure is not statistically significant. These results are basically indeterminate, inasmuch as they seem to indicate that high levels of overseas investment are associated with both higher exports and higher imports—which could in fact be the case.

Foreign investment tends to be concentrated among large firms, which have both the resources and the institutional structure to operate in all phases of international business, including investment, exporting, and importing.

Nevertheless, the data comparisons contain a hint that the major foreign investors' contribution may perhaps be somewhat stronger on the export side than on the import side of the ledger. To pursue this further, comparisons were made which attempted to relate the measures of trade performance to some benchmark representing the size of the U.S. market (net sales) for the products of each industry in 1968. For imports, the "share of domestic market" variable is a direct and commonly-used measure of import penetration. For exports, the variable does not have such a meaning, but it does serve to make import and export performance more directly comparable by relating each to a common base. Moreover, for most U.S. industries, "size of domestic market" is more or less equal to the value of domestic output, so that the measure of export performance used here is an approximation of exports' share of domestic output.

When exports and imports are measured in terms of the U.S.-domestic market in 1968, and then compared, industry-by-industry, with foreign investment activity, the association of strong export performance with high levels of foreign investment activity holds up fairly well. Both the rank and linear correlations—while not particularly strong—are statis—tically significant. On the import side, however, no meaningful relation—ship appears to be present. There is no statistically significant correlation between the degree to which imports have penetrated any

particular industry and the degree to which firms in that industry are active or inactive as foreign investors. These results, therefore, reinforce the suggestion made above that levels of foreign investment activity seem to be more closely associated with export performance than with import performance—i.e. that those industries which invest most heavily abroad contribute relatively more to U.S. exports than to U.S. imports, and conversely for the industries in which foreign direct investment is not significant.

3. Results from the 20-industry sample

Included in the 22 industries which form the basis of this analysis are two--tobacco manufactures and petroleum refining--which could detract from the results for reasons unrelated to the hypothesis which the analysis attempts to evaluate. The U.S. tobacco industry is characterized by heavy dependence on a unique resource base, namely American-type tobaccos which cannot be duplicated successfully under foreign conditions of soil and climate. Therefore, this industry tends to be a relatively strong exporter, a relatively weak importer, and an insignificant foreign investor. The petroleum industry, on the other hand, is affected by its particular resource dependence in an opposite way. It is among the topranked foreign investors and is a poor performer in trade, largely because of its natural resource position. For these reasons, the analysis was conducted with tobacco and petroleum excluded from the data set. The results tended, without exception, to reinforce the conclusions drawn above. Correlations between foreign investment activity and both domestic investment and exports strengthened at least slightly, while

those between foreign investment and import performance weakened marginally. In the case of exports as related to domestic market size (roughly total output), the correlation coefficients not only strenthened materially but reached a higher level of statistical significance than in the 22-industry analysis.

4. Foreign investment and changes in trade performance

It is also important to determine whether high levels of overseas investment in the past decade have been associated with adverse changes in the trade position. It is possible that, in industries characterized by heavy foreign direct investment, the U.S. trade position may still be relatively strong despite its having experienced a pronounced weakening trend in recent years.

The last two sets of statistics at the bottom of table 17 represent an attempt to examine this question. They provide the results of measuring correlations between the last two columns of table 16 and column 1 of that table, the foreign investment data. Both "percent change in imports' market share" and "change in ratio of imports to exports" are measures of import penetration of the U.S. market, the former cast in terms of the size of the market itself and the latter cast in terms of the corresponding export performance of each industry. The correlations for the full-size 22-industry sample, which covers all manufacturing, are too small to be statistically significant. This suggests that, in terms of the data series used, there is no association between the intensity of foreign investment activity in any particular industry and that industry's role in the recent declining fortunes of U.S. foreign

trade--both being considered in relation to the performance of all other manufacturing industries.

While the results of these correlations are not statistically significant, the emergence of a negative sign on all the correlation coefficients has some meaning. It signifies a possible inverse relationship, i.e., that industries which invest most heavily abroad generally may have suffered the least erosion of their foreign trade positions relative to other industries, while branches of industry with the weaker foreign investment positions may have experienced greater adversities in trade performance. A close examination of the data in table 16 indicated that the source of the poor correlation results may have been the performance of only three industries--motor vehicles, electrical machinery, and nonelectrical machinery. Therefore, the correlations were run once again, this time with a sample of only 19 industries, with these three excluded. As the entries in table 17 indicate, the inverse correlations were stronger and the rank correlations reached levels at which they became statistically significant. These results confirm the inverse association between levels of overseas investment and declining trade performance for most types of industrial activity. On this evidence, multinational business would seem to help, rather than hurt, U.S. trade performance.

Unfortunately, however, the exclusion of the three industries detracts seriously from the generality of this conclusion. These industries account for some 24 percent of domestic manufacturing output, 35 percent of foreign investment by manufacturing firms, 19 percent of domestic

investment in manufacturing, 44 percent of industrial exports, and 33 percent of such imports. Presently available data do not permit sufficient analysis to seek a resolution of the problem posed by these three industries and their apparent tendency to depart from the general experience suggested by the data for the rest of U.S. manufacturing. 1/ However,

some tentative possible explanations can be mentioned. The case of the automobile industry, for example, is fairly clear-cut, with the industry's highly adverse trade performance being due in large part to the recent shift in the U.S. balance of trade in automotive products with Canada as a result of the Automotive Products Trade Agreement (APTA) between the two countries. The APTA has led to the rapid integration of the auto industries of the two countries, and a greatly increased two-way flow of trade in both parts and finished cars, while the balance of trade in this category has moved sharply in Canada's favor. This shift, attributable mainly to the special features of the Agreement itself, clearly bears little association with the causes of outflows of U.S. capital funds in other industries. 2/

 $[\]underline{1}/$ The Tariff Commission staff is engaged in ongoing research on this and similar problems, which may yield useful results in coming months.

²/ The APTA and its effects are mentioned in Part I of this Study. Also see P.183, below.

The apparent anomaly in the machinery industries' performance may reflect an overly broad definition of the industries themselves in the

foregoing analysis. Each of these "industries" has several branches of major economic importance which encompass, in the aggregate, large amounts of output, trade, and investment both at home and abroad. An adequate analysis of these industries along the lines followed above depends on the availability of investment data permitting a sufficient degree of disaggregation.

Sales of U.S. Subsidiaries Abroad and Their Impact on U.S. Imports

Total sales of U.S. foreign manufacturing affiliates increased steadily from \$25.1 billion in 1961 to \$59.7 billion in 1968 (table 18). Throughout the 1960's, European subsidiaries and affiliates of U.S. firms accounted for the largest part of worldwide sales--43 percent in 1968. Within Europe, the European Economic Community (EEC) accounted for 23 percent of the total. Outside Europe, Canada had by far the largest share, 31 percent.

A breakdown of worldwide affiliates' sales into broad industrial groups shows the transportation equipment industry accounting for the largest share; its sales rose from \$6 billion in 1961 to \$14.5 billion in 1968 (table 19). Chemicals were second, with sales rising from, \$3.9 billion to \$10.2 billion during the same period. Together, these two industries accounted for 41 percent of total sales by U.S. subsidiaries abroad during 1968. In third place was the nonelectrical machinery industry, which showed an increase from \$2.9 billion in 1961 to \$8.2 billion in 1968. Sales of the food and electrical machinery industries were about even in 1968, at about \$5.4 billion each, although the latter industry was growing much faster. The primary and fabricated metals industry had

Table 18.--Total sales of U.S. foreign manufacturing affiliates, by areas, 1961-65, and 1967-68

dollars)
of
millions
(In

Area or country	1961	1962	1963	1964	1965	1967	1968
anada	8,429 :	9,196	10,199	11,620	13,349	16,585	18,548
atin American Republics and other Western : Hemisphere	3,597	3,967	4,250	4,951	5,526	7,128	7,966
irope total: 10	10,780	12,120	14,045	16,653	18,685	23,080	25,835
European Economic Community	4,805	5,770 :	7,002	8,683	9,850	12,002	13,921
United Kingdom5	5,070 :	5,290	5,918	6,871	7,521	9,213	6,604
Other:	905	1,060	1,125	1,099	1,314	1,865	2,310
:her areas	2,255	2,640	3,315	4,214	4,757	6,358	7,327
Japan	380	430 :	515	710	086	1,600	1,980
tal all areas: 25	25,061	27,923	31,809	: 37,438 : 42,317 :	42,317	53,151	59676

Source: Compiled from the Survey of Current Business, U.S. Department of Commerce, November 1966 and tober 1970.

Table 19.--Total sales of U.S. Foreign Manufacturing Affiliates, by Commodity, to All Areas, 1961-65, and 1967-68

	C	(In millions of dollars)	ns of	E dol.	lars)						
Industry	1961	1962		1963	1964		1965	:: ::	1967		1968
			••			"		::			
Food products	3,195	3,310	د .	,462	3,6	: 73	4,015	••	5,098	••	5,366
Paper and allied products:	1,060	1,180		1,342	: 1,595	5:	1,803	••	2,172		2,534
Chemicals	3,890	4,400		,130	: 5,903	3 :	6,881	•••	8,857		.0,215
Rubber products:	1,195	1,332		,350	: 1,582	32:	1,710	::	1,978	••	2,126
Primary and fabricated:		••			••	••		::			
metals:	1,875	2,053	: 2	2,433	2,940	•	3,091	••	4,049	••	4,666
Machinery excluding :					•	••		::		••	
electrical	2,897	3,359	ش	,716	: 4,59	. 2	5,364	::	7,384	••	8,192
Electrical machinery:	2,234	2,671	: 2	2,986	3,579	. 6	3,992	::	4,752		5,298
Transportation equipment:	6,000	6,680	·•	,050	9,46	99	10,745	••	12,850	••	.4,522
Other products:	2,715	2,938	3	,340	: 4,124	: 43	4,716	::	6,011		6,757
Total:	25,061	27,923	: 31	31,809	37,438	8	42,317	::	53,151		929,65
			••			••		::			
									,		1 1

Source: Compiled from the Survey of Current Business, U.S. Dept. of Commerce, October 1970.

\$4.7 billion in sales during 1968. Paper and allied products and rubber goods showed sales of \$2.5 billion and \$2.1 billion, respectively, during 1968; their shipments increased by 40-50 percent during the 1961-68 period.

The bulk of merchandise manufactured by U.S.-owned affiliates abroad is sold locally or exported to other countries outside the U.S. However, an increasing percentage of goods produced abroad is being imported into the United States. Such imports accounted for \$1.1 billion or 3.9 percent of total affiliates' sales in 1962, increased to \$1.8 billion or 4.2 percent in 1965, and reached \$4.7 billion or 7.9 percent in 1968 (table 20).

U.S. foreign subsidiaries manufacturing transportation equipment supplied more than half (52 percent) of total U.S. imports from foreign subsidiaries in 1968 (table 21). These imports—mainly autos—rose rapidly from \$78 million in 1963 to \$2.5 billion in 1968, primarily because of the U.S. automotive agreement with Canada, signed in 1965. 1/ As a result

of this agreement, imports of automotive products from Canada increased from \$227 million in 1965 to \$3.1 billion in 1969, $\underline{2}$ / or by almost

 $[\]underline{1}$ / See p. 179, above.

^{2/} Fourth Annual Report of the President to the Congress on the operation of Automotive Products Trade Act of 1965, Committee on Finance, U.S. Senate, November 1970.

fourteen times. In 1968, the last year for which data on both U.S. imports from foreign manufacturing affiliates and imports under the APTA are

Table 20.--Sales of U.S. Foreign Manufacturing Affiliates to the United States, Exports to Other Countries, Local Sales, and Total Exports to All Areas, 1961-68

		(In 1	(In millions of dollars)	f dollars				
	1961	1962	1963	1964	1965	1966	1967	1968
Exports to the United States	1/	1,089	1,089: 1,277: 1,536: 1,789	1,536	1,789	1/	3,688 4,741	4,741
Exports to other countries	1/	3,825	3,825: 4,361: 5,032: 5,842	5,032	5,842	1/	7,469 8,470	8,470
Local sales	1/	23,009	23,009 : 26,171 : 30,870 : 34,686	30,870	34,686	1/	41,994 46,465	46,465
Total sales	25,061	27,923	25,061 27,923 31,809 37,438 42,317	37,438	42,317	1/	53,151 59,676	59,676
1 / M 4		•						

1/ Not available.

Source: Compiled from the Survey of Current Business, U.S. Dept. of Commerce, Nov. 1965,

Nov. 1966 and Oct. 1970.

Table 21.--Sales of U.S. Foreign Manufacturing Affiliates to the United States, by Industry, 1963-65 and 1967-68

(In millions of dollars)

Industry	:	1963	:	1964	:	1965	::	1967	:	1968
	:		:		:		::		:	
Food products	-:	81	:	107	:	119	::	187	:	211
Paper and allied products	-:	485	:	594	:	643	::	697	:	745
Chemicals	-:	147	.:	136	:	171	::	172	:	189
Rubber products	-:	8	:	5	:	7	::	29	:	30
Primary and fabricated metals	-:	159	:	221	:	183	::	340	:	398
Machinery, excluding electrical	-:	107	:	138	:	167	::	250	:	338
Electrical machinery	-:	. 27	:	40	:	59	::	62	:	90
Transportation equipment	-:	78	:	156	:	278	::	1,744	:	2,485
Other products		185	_:	139	:	162	::	207	_ : _	255
Total sales	-:	1,277	:	1,536	-:	1,789	::	3,688	:	4,741
	:		:		:		::		:	• ,

Source: Compiled from the <u>Survey of Current Business</u>, U.S. Department of Commerce, November 1966 and October 1970.

available, auto imports from affiliates under the APTA amounted to \$2.3 billion, or practically all of total U.S. imports of transportation equipment produced abroad by U.S. subsidiaries (\$2.5 billion). Other imports from Canadian-based U.S. affiliates showed only a small rise during the same period.

Imports of paper and allied products, although not as large as those of transportation equipment, were significant, and rose from \$485 million in 1963 to \$745 million in 1968. Imports of primary and fabricated metals from U.S. subsidiaries abroad also rose considerably from \$159 million to \$398 million. Although imports of nonelectrical machinery were much larger than those of electrical machinery (\$338 million and \$90 million, respectively, in 1968), they increased at about the same rate. Imports of chemicals increased steadily after 1962, but remained rather small, reaching \$189 million in 1968.

Because of the stimulative influence of the APTA, Canada supplied the bulk of U.S. imports from foreign subsidiaries in recent years. The total of all affiliates' shipments across the border from Canada rose from \$1.0 billion in 1963 to \$3.8 billion in 1968 (table 22). Canada's share of the worldwide total varied between 77 and 81 percent during this period. Although imports from Europe rose at a faster rate, they were much smaller, increasing from \$123 million in 1963 to only \$549 million in 1968. Smaller still, imports from Latin America also increased rapidly, rising from \$82 million in 1963 to \$212 million.

Table 23 pulls together the foregoing sales information in analytic fashion, in an attempt to facilitate an examination of the impact of

Table 22.--Sales of U.S. Foreign Manufacturing Subsidiaries to the United States, by Country of Origin, 1963-65, and 1967-68

	(In mi	lllions	01	dolla	rs)	
Country or area	1963	1964	:	1965	:: ::	1967	1968
Canada:	1,035	1,219	:	1,380	::	2,956	: : 3,787
Europe	123	185	:	231		394	: 549
Latin America	37	80	:	101	::	161	: 212 :
Other areas				77	_ ` _		
Total, all areas:	1,277	1,536	:	1,789	::	3,688	: 4,741
. •		.	:		::		:

Source: Compiled from <u>Survey of Current Business</u>, U.S. Dept. of Commerce, November 1966 and October 1970.

Table 23. -- U.S. Imports of Manufactured Goods in 1968: Total and from Affiliates of U.S. Firms; Average Annual Growth of Imports from Affiliated and Non-affiliated Sources, 1963-68

	(Amou	Imports in 1968 From : a affillates : a	(Amounts in millions of dollars) Imports in 1968 : Imports from affiliates tal: From affiliates : affiliates: as percent : of total	Averag Total: imports:	Average Annual Growth Rates 1963-68 tal : Imports : Import from orts : affiliates : foreign Percent per annum	h Rates Imports from foreigners
All manifactured coodessesses.	. 25 312	741	9	17.6	30.	15.6
	3,008	211 8	_	32.0 :	29.2:	33.0
Paper and allied products:	1,390:	745	54	: 22.9 :	. 0.6	82.2
Chemicals:	981:	189	19	: 11.4:	5.2 :	13.2
Rubber products	416:	30	_	25.4:	30.3:	25.0
Primary and fabricated metals:	4,706:	398	∞ 	: 21.0 :	20.1:	22.0
Nonelectric machinery:	1,797 :	338	19	31.2:	25.9 :	32.7
Electric machinery:	1,714:	06	5	: 9.6	27.2 :	0.6
Transportation equipment:	4,599	2,485	54	: 16.7 :	100.0	0.7
Other	6,701:	255	7	12.2	9.9	12.4
Total, excluding trans- portation equipment:	-:20,713	2,256	11	17.2	13.5 :	17.8
••	•			•	•	

Employment, Output, and 21 and Trade Relations Council of the United States, Inc., U.S. Manufacturing Industries, 1958-68/69, 3rd ed., 1971 Table Foreign Trade of Source:

imports from foreign affiliates on U.S. imports of manufactured goods in general. Comparisons for 1968 indicate that the role of foreign manufacturing affiliates was substantial; imports from these enterprises amounted to 19 percent of all inbound shipments of manufactured goods in that year. With respect to the particular industries for which comparable data are available, the level of subsidiaries' "penetration" ranged from a low of 4 percent in the "miscellaneous" category—which includes twelve of the 22 major industrial categories—to a high of 54 percent in the paper and transportation equipment industries.

The last three columns in table 23 compare average annual growth rates for the 1963-68 period of (a) total imports, (b) imports from affiliates abroad, and (c) imports from non-affiliated foreigners. Here it is apparent that, for most industries, shipments into the U.S. from subsidiaries abroad have lagged, rather than led, the general growth of There are three exceptions. Two of these--rubber products and electrical machinery--are insignificant because the growth rates are distorted by a very small base and because, even in 1968, imports from affiliates in these industries were miniscule. The third exception is the transportation equipment industry which, as is pointed out above, was influenced almost exclusively by the special circumstances presented by the APTA with Canada. Because of this unique situation, a more accurate assessment of the overall performance of U.S. industries' manufacturing affiliates abroad in relation to U.S. imports may be found in the exclusion of the data on transportation equipment from the analysis. This is done on the bottom line of table 23, which substantially reverses

the conclusion suggested by the aggregated data. Thus, for all manufacturing, the affiliates' share of total imports drops by nearly half, to 11 percent, and in the growth rate comparisons the affiliates are shown to have increased their shipments to the U.S. at a significantly slower rate than have non-related foreigners. With the major exception of the motor vehicle industry, the multinational arms of American manufacturing industry, at least through 1968, appear to have been losing rather than improving their share in the U.S. import market in the face of non-related foreign competition.

Summary

On balance, the evidence on foreign investment and trade performance of the multinational firms presented in this section indicates that the operations of these companies had a favorable impact on U.S. foreign trade competitiveness. There appears to be a clear association between the intensity of foreign investment activity in the different branches of manufacturing and levels of investment at home. Furthermore, industries characterized by heavy overseas investment in productive facilities appear also to be those which not only contribute most heavily to U.S. exports but also have had the least impact on the upsurge of U.S. imports—with exactly the reverse results appearing for those industries in which strong foreign investment activity is not characteristic.

The Role of Technology and the Diffusion of Technology in U.S. Trade Performance

One of the apparent paradoxes of American foreign trade performance during the bulk of the postwar period—i.e. until the balance of trade deteriorated seriously in the latter half of the 1960's—was the persistence of strong exports and a sizeable trade surplus despite the high—wage cost structure of American industry. Few can remember when U.S. wages were not the highest in the world, by far. There have been many explanations of this paradox, the most notable being the orthodox view that U.S. trade performance was attributable largely to the extraordinary productivity of the American worker, which so far surpassed that of the foreign worker that much higher wages in the domestic economy were not only possible but justified. Yet, from an analytic point of view, this explanation perhaps hid more than it revealed, and it has come under heavy attack in recent years as the trade balance has declined.

Alternative and complementary explanations began to find increasing acceptance during the last decade. One of these held that the United States' position as a surplus trading nation stemmed from the overwhelming technological superiority of American manufacturing industry. This superior "fund" of technological knowledge--knowhow, in common parlance--was held to have its origin in the enormous R & D effort which came to be institutionalized in the postwar economy and which provided a continuous stream of new products and new techniques that, by sheer size and quality, kept the nation and its exports in the industrial vanguard of the developed countries. Yet this explanation, too, has been challenged by the lack-luster performance of U.S. trade in recent years. There is question

whether technology and the R & D effort which generates it still can have much influence on the patterns of trade, and whether, even if they do, the United States may not be in the process of throwing away its technological patrimony by dispensing its techniques and expertise too freely and too rapidly abroad. Historians will recognize in this an argument which raged across Europe when the U.S. was a young nation and the Industrial Revolution was likewise in its infancy; many a process or design which formed the basis for fledgeling industry in America had to be smuggled past stiff barriers erected against the outflow of technology from the U.K. and other economic powers of that age. The U.S. today has few such barriers, and its technology undeniably is spreading rapidly throughout the world. Those who claim to see American technological leadership dwindling wonder whether barriers ought not be erected.

This section of the Tariff Commission study is addressed to two main questions. In the first part of the analysis, an attempt is made to verify that technology still plays a key role in American foreign trade, especially on the export side. Much of the extant research on this subject, while of relatively recent vintage, covers the period of the early-to-mid 1960's, when the U.S. still enjoyed large trade surpluses and its trading position seemed secure. It is necessary to know whether conclusions based on the data from this earlier period still hold up during the period of deterior-ating trade balances after 1965.

The second part of this section is concerned with the problem of how stepped-up rates of international diffusion of technology-"technology-sharing"--may have affected the United States' trade position in recent years. Research in this subject is difficult because of scarcity of data.

Only one government, that of Japan, systematically collects meaningful information on flows of technology on anything approaching a comprehensive basis. For this reason, the study has had to be confined to the analysis possible from these data, which naturally concern mainly that country. However, certain tentative generalizations about other countries' trade performance in relation to technology sharing can emerge from the analysis, and the data shed considerable illumination on this aspect of Japanese-American trade as well.

Trade and Technological Muscle

An important study of the role of technology in U.S. export trade was conducted a few years ago by Donald B. Keesing. 1/ This study related measurements of U.S. exports as a share of the total exports of the "Group-of-Ten" 2/ industrial nations to a number of different indicators of

Unfortunately, this study became dated only too rapidly. Its measures of trade performance and R & D effort all related to the early years of the last decade, the trade data to 1962 and the R & D indicators to 1960-62.

^{1/} Keesing, Donald B., "The Impact of Research and Development on United States Trade," Journal of Political Economy, February, 1967.

²/ U.S., U.K., West Germany, France, Italy, Belgium, Netherlands, Sweden, Canada, and Japan.

research and development in several manufacturing industries. Professor Keesing found strong support for the proposition that trade performance—as revealed by the U.S. share in export trade of the major industrial powers—is closely associated with the intensity of R & D activities carried out in the different industries which contribute to trade.

As a significant "explanation" of U.S. trade, it served well for that period, but it has been an unsettled question whether an analysis along these lines would be equally or nearly equally explanatory of U.S. export performance in the years since 1967. To examine this question, the Keesing study has been reproduced, using data for 1969. The key results of this work are displayed in tables 24, 25, 26, and 27; and they are compared with Professor Keesing's principal statistics in summary form in table 28.

The main analytic tool employed in these studies was the correlation coefficient. The research revealed that R & D activities remain closely correlated with U.S. export performance; the various indicators of R & D intensity are too strongly related to export performance for the results to have been attributable merely to chance.

Another use of the data, which permits a look at imports as well as exports, is to calculate from the last four columns of table 27 the total employment and R & D personnel "requirements" embodied in exports and imports of 1969 for the 18 industries covered by the table. These industries cover a significant amount of U.S. trade in 1969—\$26.1 billion in exports and \$20.5 billion in imports. The employment requirements for each industry were calculated by multiplying exports and imports, respectively (in terms of billions of dollars), by total personnel and R & D personnel required to produce \$1 billion in domestic sales. The results were then summed across all 18 industries, to yield the material for the following tabulation:

Table 24.-- Competitive U.S. Trade Performance in Comparison with Research and Development

	18 Industries	
Industry	U.S. Exports as Percentage of Group of ten exports, 1969	Scientists and Engineers engaged in R & D as a Percentage of employment, 1969
Aircraft	62.45 37.33 21.44 26.30 28.10 22.20 27.50 15.00 21.13 14.70 16.00 15.47 16.40 12.46 9.45 17.10 7.50 9.44	7.68 6.66 7.25 1.06 3.67 4.55 4.16 0.61 1.24 3.07 0.65 0.46 0.74 0.59 0.60 0.12 0.20 0.26
Rank correlation: : Spearman coefficient: Kendall coefficient: Linear correlation:	0.	785 621 770

Table 25.--Federal and Company Funds Spent for the Performance of Research and Development in Comparison with Trade Performance, for Sixteen Industries, 1969

Industry :	U.S. share of group of ten		D as perce	
	exports	Company	Federal	Total
Aircraft	62.45	<u>1</u> / 2.52	1/8.91	11.43
Scientific and mechanical measuring instruments: Drugs: Machinery: Chemicals, except drugs: Electrical equipment: Rubber products	37.21 21.44 30.23 22.24 27.50 15.00	2.20 1/6.88 2.44 1/2.48 4.00	1/ 0.14 : 0.70 : 1/ 0.66 : 4.74 :	7.02 3.14 3.14 8.74
Motor vehicles and other transport equipment: Other instruments: Petroleum refining: Fabricated metal products: Non-ferrous metals: Paper and allied products: Lumber, wood products, and	22.60 14.70 16.00 15.47	· 0.43 · 0.53 ·	2.37 1/0.12	6.83 1/1.45 0.46 0.58
furniture	6.95	0.10 : 1/ 0.11 : 0.42	1/0.02	
Correlation with 1st column: Rank correlation: Spearman Kendall Linear correlation	-	0.803 0.550 0.380	: 0.582	: 0.644

^{1/} Estimated.

 $[\]frac{2}{2}$ Less than 0.005 percent.

Table 26.--Research and Development by Product Field versus Competitive Trade Performance, 1969

	Trade rea	riormance, 19	· · · · · · · · · · · · · · · · · · ·	
Product field :	R & D	R & D as percentage of value added in industry	SITC categories assumed to correspond	U.S. exports as percentage of group of ten exports
:	Million : dollars :			
Aircraft: Office machinery:	2,548 801		734,711.4 714	62.45 37.33
Farm machinery: Professional and :	99		712	32.51
scientific in- : struments:	791		861,862,864	27.58 27.50
Electrical equip-: ment:	3,391 :	:	722,723,725,726, 729 exc. 729.3	
<pre>Industrial chem- : icals :</pre>	391 :	և.48	512,513,514,521, 531	25.01
Construction and : other machinery-:	460 :		717,718,719	25.51
Engines, turbines-: Other chemicals:	206 : 248 :		: 711 exc. 711.4 :	25.34 22.56
Agricultural chem-: icals:	106	10.6h	: 561,599.2	22.18
Drugs: Motor vehicles:	411 : 1,014 :		: 541 : 732	: 21.44 : 21.13
Metal-working : machinery: Plastics and :	83	1.54	715	19.18
synthetics: Fabricated metal:		10.22	231.2,266,581	18.29
products: Non-ferrous metals:	499	2.39 1.29	: 69,812 : 68 exc. 681,688	: 16.00 : 15.47
Rubber products: Stone, clay, and :				: 15.00
glass products: Other transport	155	1.48	66 exc. 667	12.46
equipment: Ferrous metals:		_	731,733,735 67	9.45 9.44
Correlation of columns 2 and 4:: Spearman: Kendall: Linear Logs (linear)-:			0.765 0.621 0.797 0.771	

112.5 Million 1,374.3 1,019.0 748.8 1,198.8 443.2 Imports dollars 363.3 5,748.8 1,035.7 3,100.7 2,677.7 194.9 3,788.0 427.9 774.2 2,785.9 712.0 328.9 615.6 Million dollars Exports R & D per : : Scientists neers in and engisales **Employment** #1 billion 34,596 30,106 30,106 35,108 35,108 35,376 36,260 15,747 15,747 17,743 17,600 27,605 35,836 38,176 40,276 42,051 27,604 sales per shipments) (value of Billion dollars Sales 22.29 7.60 6.23 4.8.27 111.71 41.94 15.73 51.52 51.52 21.69 24.05 17.07 Employment 771, 200 221, 900 125, 500 1125, 500 1111, 100 757, 100 570, 000 811, 300 107, 700 107, 700 381, 800 661, 000 329,800 565,100 971,900 923,600 611,900 Percentage engineers tists and of scienengaged in R & D 95770 CE 19.7 31.2 percentage: of employ-: Scientists and engineers as ment Stone, clay, and glass products Office machinery--------Paper and allied products ----Other transport equipment----Amber and wood products----Chemicals, except drugs-----Non-ferrous metals Motor vehicles-wassammenter Other machinery------Rubber products-----Blectrical equipment Instruments-----Primary ferrous metals Aircraft------Industry

Table 27. -- National Science Foundation Data and Trade Classification Underlying Table 24 and Certain Subsequent Computations, 1969

Table 28.--Comparison of Keesing's tests for the influence of R & D on U.S. exports in 1962 with the Tariff Commission's reproduction of the Keesing study, using 1969 data

	Type of	KAACING	: T.C. repro-
Variables tested	corre-	: 1962 duction	
:	lation	: 1902	: 1969
		•	•
U.S. exports as percent of G-10 exports	}	:	:
vs. number of scientists and engineers	}	:	:
	Rank 1/	: 0.94	: 0.79
employment, 18 industries			.77
		•	•
U.S. exports as percent of G-10 exports	•	:	:
• • • • • • • • • • • • • • • • • • •	Rank 1/	: .78	.77
value added, 22 industries			
, , , , , , , , , , , , , , , , , , , ,	•	:	:
U.S. exports as percent of G-10 exports		:	:
(16 industries), vs	•	:	•
(20 2000000,, 101	•	:	:
(1) Company-funded R & D percent of	Rank 1/	: .84	.80
total shipments		: .59	
cotal surpments	•	:	•
(2) Federally-funded R & D as percent	: Rank 1/	: .73	3: .79
of total shipments		: .84	
- cour ourbment	:	:	:
(3) Total R & D expenditure as percent	Rank 1/	: .92	2 : .84
of total shipments			•
or coest outheren	:	:	:
	•		

^{1/} Spearman coefficient.

Source: Keesing, Donald B., "The Impact of Research and Development on United States Trade," <u>Journal of Political Economy</u>, February 1967, and Tables 24-27.

	Exports	<u>Imports</u>
Total required employment (persons)	762,414	544,020
Required R & D Employment (persons)	21,969	9,436
R & D requirement as percent of total requirement	2.88%	1.73%

Since the labor requirements produced from these calculations are based on U.S. production conditions for both exports and imports, the figures for the latter should be considered as referring to "import replacements" rather than actual imports, in the same sense as that in which this term was used in an earlier section. 1/

1/ See p. 144 above.

These calculations show that, of the total employment that would have been needed to "replace" 1969 imports for these industries, an estimated 9,436 scientists and engineers—1.73 percent of the total—would have been in the group. Actual exports, however, required 21,969 such technical personnel, or 2.88 percent of the total.

The Keesing study made similar calculations for U.S. trade in the same industrial products in 1961. The percentage of total employment required to generate these industries' exports in that year was almost exactly the same as for 1969--2.87 percent--but it is significant that the calculated requirement for scientists and engineers in R & D to produce the requisite import replacements was much lower than in 1969--1.21 percent. Thus, while exports would appear still to have had a substantial

technological lead over imports as recently as 1969, it also is clear that imports gained considerably in technological intensity over the eight-year period. $\underline{1}$ / At least three basic forces may have been at work

to produce this change: (1) the increasing industrial sophistication of the United States' principal foreign competitors, especially Canada,

Japan, and West Germany, resulting from more intence R & D efforts conducted locally in these countries; (2) rising U.S. imports of goods (especially autos from Canada) produced abroad with U.S. technology by foreign affiliates of U.S. firms 2/; and (3) the increasingly rapid spread

and intermingling of the technologies of all the industrial countries which has characterized much of world economic development in the last decade or so. This third factor is the subject of the following discussion.

The Impact of Technology Sharing on Trade

Many observers have questioned whether large-scale sharing of technology may not be the major factor--or at least a contributory one-- in the weakening of the U.S. balance of trade in recent years. Technology sharing grew rapidly in the sixties. Measured in current dollars, the U.S. balance on royalties and licensing fees increased more than threefold during the decade,

 $[\]underline{1}/$ These results mirror those cited on pp. 151-152 in the discussion of "human capital", as reflected in labor skill ratios, as a determinant of trade patterns.

²/ See preceding section, pp.163-190, for a discussion of this factor.

from \$584 million in 1960 to \$1,687 million in 1969 (see table 29). figures on payments for technology flows appear to point down a one-way street for the U.S., with American entrepreneurs freely passing out knowhow abroad for large royalties and licensing fees, while they get (and pay for) very little return flow of technology. As table 29 shows, receipts for sales of technology in 1969 were almost ten times as large as payments for foreign technology, the latter amounting to less than \$200 million. However, nearly 3/4 of the receipts recorded in that year were received from affiliates in which U.S. firms had direct investment and, therefore, a large measure of control. The transfers of technology in such cases often involve licensing, cross-licensing, and similar arrangements within closed corporate families, and it would be inaccurate to consider the technology at issue to have passed out of control by U.S. citizens. 1/ Therefore, the data in table 29 should not be taken to represent the magnitude of flows of knowhow out of American hands. the other hand, they do purport to show shifts in the locus of technology from the U.S. to foreign countries. This is the important factor to be considered in an examination of the impact of technology transfers on U.S. foreign trade, because it allegedly leads to a corresponding shift in the locus of production.

^{1/} The collection of inflated royalties and licensing fees from overseas subsidiaries is a well-known technique by which multinational firms extract profits from affiliates before host-country tax collectors can lay a hand upon them. This practice is of no interest for the present study, except insofar as the data may contain some considerable overstatement of the degree to which royalties, fees, and similar receipts represent actual outflows of technology in the past.

Table 29.--Estimated U.S. receipts and payments of royalties and licensing fees with Canada, Japan and the World, 1960-69

(In millions of dollars)

							LII	million	15	01 00	11	ars)						
Year	: :		Canada		:			Japan			:	Total with all countries						
ieai	:	Re-	:	Pay-	:	Bal-	-:	Re-	:	Pay-	:	Bal-	-:	Possinta	:	Pay-	:	Palanaa
	: ce	ipts	:	ments	:	ance	:	ceipts	:	ments	:	ance	:	Receipts	:	ments	:	Balance
	:		:		:		:		:		:		:		:		:	
1960	: 1	17.6	:	10.8	:	106.8	:	54.4	:	-	:	55.0	:	650.4	:	66.5	:	583.9
1961	: 1	32.8	:	17.9	:	114.9	:	61.9	:	_	:	61.5	:	707.1	:	80.0	:	627.1
1962	: 1	52.4	:	34.0	:	118.4	:	66.6	:	2.9	:	63.7	:	835.6	:	100.6	:	735.0
1963	: 1	58.2	:	42.4	:	115.8	:	73.0	:	2.0	:	71.0	:	932.7	:	111.5	:	821.2
1964	: 1	83.3	:	37.8	:	145.5	:	82.8	:	1.7	:	81.1	:	1,056.7	:	127.4	:	929.3
1965	: 2	11.5	:	41.0	:	170.5	:	86.0	:	2.2	:	83.8	:	1,259.0	:	135.4	:	1,236.0
1966	: 2	44.9	:	22.3	:	222.6	:	96.2	:	3.8	:	92.4	:	1,383.1	:	119.4	:	1,263.7
1967	: 2	77.2	:	22.2	:	255.0	:	130.7	:	5.6	:	125.1	:	1,541.7	:	145.0	:	1,396.7
1968	: 2	94.7	:	27.0	:	267.7	:	174.1	:	8.0	:	166.1	:	1,702.1	:	165.0	:	1,537.1
1969	: 2	99.2	:	31.8	:	267.4	:	209.0	:	10.0	;	199.0	:	•				1,686.8
	:		<u>:</u>		:		:		:		:		:		:		:	-

Source: Unpublished material from Office of Business Economics, Department of Commerce.

Several factors have affected the sharp rise in technology sharing in recent years. The rise of the multinational corporation has had a considerable impact; the rapid growth of a number of foreign economies has made for strong demand for U.S. technology. And, further, there has been more technology to share. Among the industrial nations, R & D efforts have sharply accelerated. A recent study on the diffusion of new technology comments,

The advance in industrial techniques since the second world war has been spectacular. ...[A]ctivity has been channelled into 'research and development' on a scale unique in history, and many authorities believe that the advance in the application of scientific progress is tantamount, with all its social and other consequences, to a second industrial revolution. $\underline{1}/$

While most technology is bought and sold by private business in free enterprise economies, technology-sharing among countries likewise occurs through the instrumentality of government. Thus, for example, the U.S. signed an agreement with Japan at the beginning of the sixties for the development in Japan of manufacturing capability for defense aircraft. The program for the production of 180 Lockheed F-104J Starfighters and 20 trainer planes

cost about \$269 million, of which the U.S. Government contributed \$75 million. It involved the Japanese manufacture of most of the airframe and J-79 engine components, plus assembly of some of the electronic items. Three F-104J planes were manufactured, assembled, and test-flown in the

^{1/ &}quot;The Diffusion of New Technology, A study of Ten Processes in Nine Countries", National Institute Economic Review, May 1969, p. 40.

United States; 17 knock-downs and sets of component parts were manufactured in the United States and assembled in Japan; 160 F-104DJ planes were manufactured in the United States and should be assembled in Japan. The 30-plane. . . [successor] program increased the proportion of engine components manufactured in Japan and added additional Japanese responsibilities for assembly and manufacture of electronics. 1/

Part of the difficulty in assessing the extent to which changes in technology sharing may explain the decline in the trade balance of the U.S. arises from the difficulty of measurement. There is no clear way in which changes in technology flows can be measured. Two common methods of measurement have to do, on the one hand, with receipts and payments for royalty and licensing fees and, on the other, with simply counting the number of agreements. Both have serious shortcomings. Royalty and licensing fees do not neatly reflect the importance of the technology, but only provide a measure of the sale or rental price. Importance and price do not enjoy a one-to-one correlation. Similarly, a mere count of agreements lacks indication of the important and unimportant. Further, the international trade impact of the shared technology depends upon the entrepreneurial qualities of the management of the firm to which it has been licensed, the scale of the firm and its export orientation, and diffusion within the foreign industry. Those engaged in internationallicensing work comment on the wide contrast in the consequences of technology-sharing among different recipient countries. In some countries new technology is rapidly diffused; in others, it goes little beyond the

^{1/} Raymond Vernon, The Technology Factor in International Trade, New York, 1970, p. 325.

original contracting firm. Studies of the spread of particular processes often employ diffusion indexes to measure the speed of industry-wide adoption. 1/

A proper analysis of the impact of technology flows on trade patterns requires consistent data, broken down by country and by industry. Such figures are lacking, except in the official statistics of one country—Japan—which has taken a highly rational and organized approach to the importation of foreign techniques and processes. These constraints imposed by the available data force the limitation of the following analysis to the Japanese experience as a case study. It will be possible in this analysis to consider Japanese—American trade in some detail, along with a discussion of corresponding transfers of technology that may have had some impact on the two countries' reciprocal trade in manufactured goods.

The Japanese case, moreover, is illustrative of some of the most nagging problems that technology transfers seem to raise in international trade. Japan avidly seeks foreign techniques and processes and has succeeded in retaining the maximum possible control over them after they have been obtained. This has been accomplished via extensive controls over foreign private investors in Japan, who have been limited essentially to minority ownership in enterprises in which they seek a stake. As a result, for example, more than 3/4 of recorded U.S. royalty and licensing receipts from Japan in recent years have been in the "indirect" rather than "direct" category. The key question which has arisen in this

^{1/} Cf., for example, National Institute Economic Review, May 1969, summarizing a six-country, six-institute study of selected processes.

connection is whether Japan has thereby acquired—at minimal social and economic cost—the technological wherewithal for inundating its principal trading partners (notably the U.S.) with goods produced with their own knowhow.

Technology Flows and Trade: the Japanese Case

Foreign technology has played an integral part in Japan's strong growth performance in the last decade and a half. Japanese Government studies "indicate that about 10 percent of total manufacture in Japan is carried out using foreign technology". 1/ This is an average for all manufacturing; certain industries show a higher percentage, such as chemical fibers and rubber, and other industries a lower percentage, such as precision instruments and shipbuilding. Some observers hold that "in general the modern sectors of industry are dependent on foreign technology for some 25-30 percent of output". 2/

For any economy striving to come abreast of more advanced economies it makes good sense to purchase technology rather than devote resources to independent development. Typically, the cost of development in economies which are less sophisticated is considerably higher than in the more advanced countries. Moreover, if the technology is purchased, the purchase price rarely reflects the full costs of development, and the acquisition, therefore, comes at highly advantageous rates. 3/

^{1/} Cited in James C. Abegglen, ed., Business Strategies for Japan, 1970, p. 118.

^{2/} Ibid., p. 118.

^{3/} Ibid., p. 125 where it is observed "It is quite clear that royalty payments on significant developments need to be very high indeed to compensate fully for the very high costs of development. Yet there is a tendency to view payments for technology as windfall income, and to make little effort to determine a fair policy."

Japan began the postwar period with the economy devastated and with the inflow of technology having been at minimal levels since 1939. Although Japan was an Axis partner, its geography prevented foreign technology from entering the country in any volume during the World War II years. It was out of such circumstances that government and business leaders chose to frame consistent policies for the control and guidance of technological inputs as they set about to rebuild their economy. Through exchange and investment controls, the Government has made sure that the acquisition of foreign technology has been in industries of greatest importance to Japan's future growth. As the Boston Consulting Group comments, 1/

At the operational level, the application of foreign exchange controls to the purchase of technology has made it possible to set up mechanisms for controlling competition between Japanese purchasers of particularly desirable technologies, controlling the possible impact of new products and processes on domestic competition, especially in the small business sector, and helping to ensure that the particular technology selected for purchase is indeed the best available in the world as well as being reasonably priced.

Rivalry for technological advance within Japanese industries has been of extraordinary dimensions in the last two decades. The zaibatsu-dissolution program carried out by the Occupation upset the pattern of "cordial oligopoly" which had existed among Japan's business groups.

^{1/} James C. Abegglen, editor, <u>Perspectives-Eusiness Stragegies for Japan</u>, p. 122.

Instead of being restrained by their top holding company in the interests of the overall strategy of the group, each of the key zaibatsu "subsidiaries" as well as each of the postwar newcomers, was on its own. The combination of a looser industrial structure in the circumstances of high growth has made for exceptional rivalry. Stakes have been enormous. In the prewar form of the economy, technology entered primarily through the trading companies and was for the use of their own combines. In the looser, freer postwar structure, technology has entered both through the trading companies and directly through industrials. Further, the trading companies have not been limited in diffusion of the technology to related companies of their line.

Foreign representations against Japan's restrictions on investment have been extensive, but only a very limited amount of liberalization has resulted. Several factors underly Japan's reluctance to admit foreign equity capital, but two would appear to be of major importance; Japan's 19th-century fear of losing its sovereignty through large-scale foreign investment; and the ease of take-over given the characteristically low level of equity to debt among Japan's corporations. 1/ By contrast to corporate financing in the United States, equity among Japan's corporations tends to be low--20 to 30 percent of the capital structure, compared with 60 to 75 percent in the United States.

Not only is Japan avidly but selectively purchasing foreign technology, it is devoting increasing resources to R & D itself. In 1963-64, Japan compared fairly favorably with other leading countries in R & D

¹/ The latter point was underscored by Abegglen in testimony before the President's Commission on International Trade in Investment.

effort (see table 30). In 1964, both Germany and Japan were spending 1.4 percent of GNP. on R & D. On a per-capita basis, Japan had somewhat more scientists than did Germany.

The United States has been the most important source of Japan's foreign technology. From 1950 through 1967, the U.S. supplied between 50 percent and 60 percent of the technology imported. In absolute terms, the number of Japanese technological contracts with the United States increased three-and-a-half fold during the past eleven years, with 1968-70 having been a period of particularly high acquisitions, as the following tabulation shows: 1/

Number of technological contracts

1960	200
1963	355
1966	330
1967	388
1968	606
1969	715
1970 (6 mos.)	429

West Germany has been the second largest source, but contracts with the Germans in 1950-67 were only about a third of the number with the United States. As a proportion of total contracts, Germany supplied somewhat more than 10 percent. Imports of foreign technology from all sources have centered in electrical and nonelectrical machinery and chemicals. Metals and metal fabrication have been the next most important fields. Details on the country sources of foreign technology, as well as a breakdown of technology imports by industry, are contained in tables 31 and 32.

^{1/} For the years 1960=67, Gaishi Donyu Nenkan, 1968-69 (Yearbook on Foreign Capital Entry); for 1968 to mid-1970, the quarterly issues of Gaikoku Kawase (Foreign Exchanges).

Table 30.--Comparative National R and D Expenditures, 1963-64

	Gross expenditure on R & D ("GERD") (Millions of U.S. dollars)	: GERD per : capita : (Millions : of U.S.	GERD/GNP at market prices (percent)	: Qualified : engaged : Full-time : equiv. : (number)	in R & D : Full-time
United States, 1963-64 France, 1964	: 21,075 1,650		: 3.4 : 1.9	: 596,500 : 95,57 ⁴	
Germany, 1964	: : 1,436 :	: : 24.6 :	: : 1.4	: 105,010 :	: : 18.0 :
United Kingdom, 1964-65	: : 2,160	: : 39.8	: : 2.3	: : 159,538 :	: : 29.4 :
Canada, 1963	: : 425	: 22.5	: : 1.1	: 23,850	: : 12.6 :
Japan, 1964	: : 1,060	: : 10.9	: : 1.4	: : 197.225	20.3

Source: OECD, Gaps in Technology, Analytical Report, Paris, 1970, p. 120; Christopher Layton, European Advanced Technology, London, 1969, p. 275.

Table 31.--Japan's Technological Import Contracts, 1950-67

Total	:					••		••		• •			• •			• •				22	8		· ·	· r	·		٠.	: 4,773	
1961		. 288			٠ ٧		: 57	7	0[8			(a						1	ω.	. 1	8	1		1	CI	1	638	
1966		088	27	7 4	9	£	د 43	4	30	16	ſ	1	7	- 1	1	۲۰	- CV	~	1	; CU	m	1	Н	1	ı	1	1	109	
1965	'	. 290				27	 66	ω	ω	22	~	 	· ··			~	 . m			:⇒	Η.	 N	1	1	1	 H		472 :	•
1961		277			3 :	: 57.	: 24	 ⊅	9		٠.	۰۰۰		1		· ·	 .⇒	 -	,	 ::	 «	 N		1		 (1)	 H	200	
1963	<u> </u>	355 :		 } 72	- L	 ?)`	36:	 9	 7	15:	. 9	9		٦:	٠. س	 	 N	 H			1			 H		 1	 1	564 :	•
1962		203 :	ا د د		0	 o (12:			13:	9	 M		1				ï	,	 'm	1		 «		 1	;		328:	•
1961	. .	187 :	55	07			16:	 H	7 :		 &	 დ	 01	 m				1		2								320 :	•
1960	"	200	18:	45 :		·· ^ (: 07	 യ	 8	·· 	 დ	 				 0	 m	 N		 Q					1	1		327 :	•
1959		92:	9	16:	1	- t	-	··	 N	 o	 ო	-+ -+	٦.	 H	 H		 			 H	1	1		 i	1			153:	•
1958		63:	 യ	 છ		10	N .	 -1	 N		 ⊘	 H	 «		 H	· •	 H	1	1.				 I	1		 1		. 06	•
1957		61.:	10	·· -	7		 n	 m	 N	18:	 N	 «	1	 ლ	 m			, . I			 i				 i			: 811	•
1956 :	"	85:	9	11	9		1 7		 m	 N	 H	 . 1		 H		 Q	T	 ~			 I							144	•
1955		: 11	 N	 o	7	· ·	· 1		 (1)	 I	 H.	 T	1			 H	 ~4	 I	 I	1	 I	 I		 I		 I	 	72:	,,
:1950- : :1954 :	••	313:	: 94	23 :	12:	000	• · ·	 2 (: : :	 	75	 #	 m	 I	 I	 I	 !	 1 (I	 I.		! .\ !	977	••
Country source :1	••	United States:	Switzerland 1/:	Germany:	France:	England:	T+81v			MOT TRILL		rangma	Denmark	Morragy:	venezuela:	Austria:	Lichtenstein:	Australia:	Morocco	Delglum:	Danama:	USSI	Luxembourg:	Grade de la company de la comp	Finiand:	Czecnoslovakia:		Total	

Source: Gaishi Donyu Nenkan, 1968-69 (Yearbook on Foreign Capital Entry), p. 3

Table 32.-- Japan's Technological Import Contracts, by Industry, 1950-67

										2	13															1
Total	426	75	1,3	433	901	97.	001	1,592	95	69 1,345		378	980	•	143	96 787 787	176	103	92	99	93	25		165		4,773
1967	. tor	 	 M	31 :	65 :		 	226:		12 :	•• ••	39 :	147	••	 	 10. 40.	. 92	15:	ω	σ.	97			~~	~ F	638
1966	. 19	CV.	,. :	17 :	: : :		 Di	207 8 :	,, ., 2	: 6 : 70	•••••	. 01	126 :	•	18:	32		. 01	9	12 :	. 20	ω.	·	~ ~		601
1965	80 :	1	 ∾	. 27	36 :		01	190		15:	•• ••	34	 	 !	17:	 22	. : 51	CV .		33	-	 .==	~		~ ~ ~	472
1961	. 18	1	 . 	. 36 :			Λ.	202 :		173 :	•••••	: ०५	952	· ··	ov	% t		σ.	 . 	-	្ត	.,	· ·	 	 7	500 :
1963	122	1	 N	. I.4	: : 6 <i>T</i>	· • •	≠	272 :	22	245	•• ••	16:	 წ		 	12	16 :	16:		 O\	د با. د م	-	·· ··	 #	 	564
1962	82 :	O.	4	50	 R	******	 	 	·· ··	 1-1	•• ••	22	824	 :	۰۰ ۰۰	8 rv	 m	ν. 	α	4	., 21	9	 	ïï	Ä.	328
1961	26	 œ	 H	25 ::		·· ·· ·	 N	101 : 5		 89 °	•	 	65.1	• •• F	 2		53 ::	· ·	 တ		-	· · ·		 i rd	8 (320
1960	66	-	 (N		 8		 7	. T.		۳	•• •• !	19:	F 6		 1	다 다 : :	ω	F~	12	 1	.1	 #	 E	1 -		327
1959	39	מי יי	· ··	70	55 ::	••••		 		 56		25 :	 E	?		°	·· ··	 .#	n	 H	.i		ĝ.	 -	1. 1	153
1958	56 :	Н	!	. EI	* _C	· · · ·		 		1 6	••••	27	"	• ••	 Q	- 0	m	ιν 		 t	i	 A		 I I	1 1	06
1957	52		·· ···	56 :	·· ··		v	 	 N	 79 F		#	စ္က		 &	 81 ~	· · ·	N.	· ·	 m	1	r-t	1	i - b	 i -	118
1956	 8	ν,		9			· · ·	50 : 7		15 :	** **	18:			·· ··	 ဗ္ဗ လ	: 2T	 	٠	 N	₩	 H				72 144 1069 60 (Vector)
1955	. 71	· · ·	 	· -	 დ	~ cc	· •• •	16 :	., ., Ø	: ∾ 2	••			• ••	 ∡ŧ	 ⊘,≄	•• ••• •••!	 m	 H			er ce ;	,	1 1		72 :
1950- :	105	. e	Ħ	69	15	 	· · ·	113 : 28 :	 .a	75 :	••••	38:	83 : 7	• ••	 ₹	 జ్ఞ ణ	: 7₹	15:	12 :		.	9	 M	•• •• prof- red	 -	
Type of technology	Electrical machinery:	dustrial machinery:	Cable	Bent	other electrical equipment	Transportation		Other machinery	Metal working machinery	Textile machinery:	: Metal and metal working :	fabrication	Chemicals fibers Chemical fibers	Pharmaceutical and	agricultural : chemicals:	Organic and inorg:	Textiles	Petroleum products:	Rubber and leather prod:	Construction	Glass, stone, clay prod:	Paper and pulp-	Electricity and gas:	Entertainment: Printing and publication-:	Food products:	Total

What is unusual about U.S. sales of technology to Japan is the small proportion represented by direct investment, where majority control lies with the U.S. firm. In the case of Canada, where the export of U.S. technology has been considerably larger than to Japan, royalty and licensing fees for the United States from direct investment during the decade of the sixties were over six-and-a-half times the size of receipts from indirect investments. By contrast, the United States received from Japan close to three-and-a-half times as much in payment from indirect investment as from direct.

Although technology imports continue to highlight and dominate

Japan's technological dealings with the rest of the world, the nation's

exports of knowhow and techniques are on a noteworthy upward trend. This

relatively new phenomenon is revealed in the following tabulation of

overall Japanese payments for and receipts from technology transfers in

1960-67 (in millions of dollars):1/

Year	Payments	Receipts
1960	- 95	2
1961		2.8
1962		6.7
1963		9.1
1964		14.2
1965		16.7
1966		17.7
1967		26

Japanese exports of technology go increasingly to advanced countries. Whereas earlier it was primarily to the developing countries that Japan sent its technology, Japan now exports more of it to advanced economies, with 51 percent of total contracts going to Europe and North America. 2/

1/ For the years, 1961-66, Jukagaku Kogyo Tsushinsha, Kaigai Toshi-Gijitsu Yushutsu Soren (Japan's Overseas Investments and Technical Export), 1968, p. 378; for the years 1960 and 1967, Abegglen, ed., Strategies..., p. 131 (cited above, p. 207).

<u>2</u>/ Ibid., pp. 341-342.

Exports of technology have centered in five fields as the following contract data show: 1/

Chemicals	44	percent	
Electrical machinery and equipment	21	11	
Non-elect. machinery and equipment	11	11	
Iron and steel	7	11	
Transport	-5	11	
	88	11	

Japan exports technology to top U.S. industrials as well as to smaller corporations. Probably a number of transactions with the large industrials represent cross-licensing arrangements. Among American companies holding licenses or agreements with Japanese firms are American Cyanamid, Bethlehem, Dupont, Goodyear, Gulf, IBM, ITT, Merck, Monsanto, National Steel, Philco Ford, RCA, Texas Instrument, and Western Electric.2/

In order to analyze the effects of Japanese technology imports on Japan's international trade, comparisons of data on trade and technology flows are presented in tables 33 and 34. Table 33 compares Japanese imports of technology by source country—as measured by a relatively weak indicator, numbers of technology agreements (see pp. 205-206)—with Japanese imports and exports of manufactured goods from these same countries. In table 34, similar comparisons are made, on an industry—by—industry basis, with technology flows related specifically to Japanese trade in manufactured goods with the United States. Both tables rest on trade data for a single year, 1967.

^{1/} Business Abroad, November 1970, p. 26

^{2/} A complete list of Japanese companies licensing foreign firms including licensee and the technology in question is to be found in Jukaguku Kogyo Tsushinsha, Kaigai Toshi, Gijitsu Yushutsu Soran (Japan's Overseas Investment and Technical Export).

Table 33.--Japanese Imports of Technology, by Country Source, Compared with Trade Performance, 1967

	::Number of	:	Exports	2/ :	:	Imports 3/
Country source 1/	: contracts	:	1967	:	:	1967
	: 1950-67	:	(Percent of	total)	:	(Percent of total)
	• ;	:		,	:	
United States	2,859	:	59.1		:	. 34.9
West Germany	: 517	:	3.7	;	:	22.5
Switzerland	: 341	:	1.6		:	5.4
United Kingdom		:	4.6		:	15.0
France		:	1.4		:	5.1
Netherlands	: 129	:	2.2		:	2.0
Canada	: 102	:	5.3		:	3.7
Italy	.: 72	:	0.9		:	1.6
Sweden	·: 64	:	1.1		:	1.3
Denmark	.: 24	:	0.8		:	4.4
Venezuela	·: 23	:	1.2		:	0.1
Belgium-Luxembourg	·: 27	:	1.0		:	1.1
Austria	·: 18	:	0.2		:	0.1
Norway	·: 12	:	4.6		:	0.9
Australia	-: 9	:	6.9		:	0.6
U.S.S.R		:	3.1		:	4.5
Czechoslovakia	-: 5	:	0.1		:	0.3
Morocco, Greece,	•	:			:	•
Finland, Bulgaria	-: <u>4</u>	_:	1.9		_: .	0.6
		:			:	
Rank correlation wit		:			:	1. / 0. 700
Spearman			0.3	-	:	4/ 0.788 T/ 0.600
Kendall		:	0.2	61	:	$\overline{4}$ / 0.649
and the second s		:			:	

^{1/} The data exclude Panama (58 contracts), Lichtenstein (21), and the Bahamas (8), because of the likelihood that technology from these countries originated in subsidiaries of firms with headquarters and R&D facilities elsewhere.

Source: Technology data from table 31; trade data from U.N. Commodity Trade Statistics.

^{2/} Japanese exports of manufactured goods (SITC 5-9) to source country as percent of total exports of such goods.

^{3/} Japanese imports of manufactured goods (SITC 5-9) from source country as percent of total imports of such goods.

^{4/} Statistically significant at .01 level.

Table 34.--Japanese Imports of Technology, by Industry, Compared with Trade with the United States, 1967

Industry :	Number of contracts 1950-67 1/	U.S. exports to Japan 2/	U.S. imports from Japan 3/
Electrical machinery: Transportation machinery: Metal-working machinery: Textile machinery: Other non-electrical machinery: Metals and metal-working: Chemical fibers: Pharmaceutical and agricultural chemicals: Textiles: Textiles: Petroleum products: Rubber and leather products: Stone, clay, and glass products: Pulp and paper	378 47 143 790 176 103 76 93	: 6.8 : 8.2 : 2.3 : 0.5 : 15.7 : 7.7 : 0.2 : 2.0 : 13.5 : 0.6 : 5.1 : 0.2 : 1.1	: 22.6 : 6.1 : 1.3 : 1.6 : 3.7 : 25.8 : 0.7 : 0.3 : 1.1 : 6.9 : Neg1. : 1.9 : 3.9 : 0.4
Correlation with column 1: Rank (Spearman) Rank (Kendall) Linear		: : 4/ 0.766 : 4/ 0.597	: 0.495 : 0.363 : 0.335

^{1/} Worldwide.

Source: Technology data from table 32. Trade data from Trade Relations Council of the United States, Inc., Employment, Output and Foreign Trade of U.S. Manufacturi Industries, 1958-68/69, 3rd ed., 1971.

^{2/} Percentages of total U.S. exports of manufactured goods to Japan.
3/ Percentages of total U.S. imports of manufactured goods from Japan.

 $[\]overline{\underline{4}}$ / Statistically significant at .01 level.

Because of limitations of time and resources, only correlation analysis was used in the comparisons. Other techniques might shed more light on the questions involved, but it was not possible to employ them in the present study.

The analysis suggests rather unusual conclusions, namely that Japanese acquisitions of technology—by country and by industry, as outlined in tables 33 and 34—are more strongly correlated with imports than with exports. The data suggest little or no tendency for country—sources of technology to "match up" with country—destinations of goods made with that technology. Similarly, strong and statistically highly significant correlations exist between Japanese technology imports—of which the U.S. is the principal source—and U.S. exports of manufactured goods to Japan, by industry, while a similar association is not present for the comparable U.S. imports from Japan. This would imply that technology flows to Japan do not seriously inhibit U.S. trade competitiveness; but both the character of the data and limitations of the methodology used require that these conclusions be interpreted as highly tentative.

Summary: The Impact of Technology on Trade Competitiveness

The evidence and analysis presented in this section have reaffirmed a strong connection between the technological prowess of the United States and U.S. trade performance. U.S. exports' share of the exports of manufactures of the principal industrial countries depend heavily on their technology content, as measured by the R & D effort expended in the industries which generate them. Moreover, American exports remain more highly technology-intensive than U.S. imports (as measured on the same basis), although the amount of technology embodied in the latter appears to be

rising.

The flow of American technology to foreign countries has increased greatly. However, the bulk of this flow is directed toward overseas subsidiaries of U.S. firms, so that the control of the techniques and processes involved remains essentially in American hands. Sufficient data are not available to measure comprehensively whether the shifts in the locus of production that this flow has produced may have tended to reduce U.S. exports and increase U.S. imports. A study of data for one country, Japan, reveals little or no such influence, but these results are tentative and subject to further analysis of better data, should the latter become available.

APPENDIX

Sources of Data and Operational Definitions of Variables Used in this Study

The data for exports, imports, and value of domestic shipments used in the first sections of Part II of this study--as well as for some of the industry characteristics examined -- were taken from Employment, Output, and Foreign Trade of U.S. Manufacturing Industries, 1958-68/69 (3rd ed.), published by the Trade Relations Council of the United States, Inc. (TRC), of Washington, D.C. The TRC has tabulated Census Bureau data in such a way as to maximize comparability between available trade data and available data on domestic shipments, value added, employment, and other key material relating to U.S. industries. To meet this objective, they have combined in some instances two or more 4-digit SIC industries, and in other cases they have combined one or more 4-digit SIC industries with one or more 5-digit industry groups. These combinations have produced a total of 780 data units for which both trade and domestic shipments data could be tabulated. The 194industry sample used in this study consists of the group of industries in the TRC data corresponding most closely to the SIC 4-digit group definitions. These 4-digit designations, which match approximately but not precisely the definitions provided in the SIC itself, are listed beside the industry descriptions in the left-hand columns of tables 3, 4, and 5.

As described in the text, several alternative measures of competitive position were calculated from the TRC data. Changes in competitive position as defined for this study were computed according the formula:

$$\frac{(1968 \text{ value} - 1958/60 \text{ value})}{(1/2) (1968 \text{ value} + 1958/60 \text{ value})}$$
 (100)

Had the changes been expressed relative to either the initial year value or the end-year value, extremely large values for relative change would have appeared in the cases in which one or the other yearly value was very small—and there are several such cases in the data.

Derivation and manipulation of the series and summary statistics used in the study involved the handling of some 140 columns of numbers, arranged in 194 rows corresponding to the industry sample. This produced a total of over 27,000 individual basic, intermediate, and final data entries. Because of its size, this collection is not reproduced here. However, copies of computer printouts of the entire package or of selected portions of it are on file at the Tariff Commission in the Office of Economic Research and can be made available on request.

Some of the industry characteristics used as independent variables in this study were taken from other studies and some were formulated especially for this study. Six of the series were taken from a study by Gary Hufbauer, published by the National Bureau of Economic Research 1/

and the reader is referred there for more detailed descriptions. Hufbauer's data are given by 3-digit SITC groups, and they were converted to the SIC- 'based scheme used in the present study, using a concordance developed

^{1/} Gary Hufbauer, "The Impact of National Characteristics and Technology on the Commodity Composition of Trade in Manufactured Goods", in R. Vernon (ed.) The Technology Factor in International Trade, New York, National Bureau of Economic Research, 1970, pp. 145-231.

Capital per Man. -- This series, developed by Hufbauer, measures value of fixed plant and equipment relative to total manufacturing employment, by industry. The data represent the situation in U.S. industries as of approximately 1963.

Labor Intensity Ratio. -- This is a series developed by the TRC and included in its data, by industry. It measures the proportion of payments to labor included in value added, calculated as:

(total payroll divided by value added by manufacture) x 100 The data refer to 1963.

Wages per Man. -- Series A. Using data from the 1963 U.S. Census of Manufactures Hufbauer derived wages per man by dividing each industry's total wage bill by total employment.

Wages per Man.—Series B. The definition of this series is exactly analogous to that for Series A., except that these data were taken directly from the basic TRC source. Thus, there is an exact correspondence between these data and the precise definitions of "industries" used by the TRC, which enabled this series to be used as a rough check on the accuracy of moving from Hufbauer's SITC-based definitions to the SIC-based ones used in the study. The results were satisfactory.

Skill Ratio. -- These data, according to Hufbauer, "refer to the percentages of the industry's labor force accounted for, in the United States, by professional, technical, and scientific personnel. The data were derived on a 2-digit SITC casis, after appropriate reclassification."2/

^{2/} Ibid., p. 221.

The basic figures were taken from the Census of Population for 1960.3/

3/ U.S. Bureau of the Census, <u>U.S. Census of Population</u>, 1960: Occupation by Industry, Washington, U.S. Government Printing Office, 1963.

In this study, industry values were assigned by using Hufbauer's SIC-STIC concordance.

Scale Economies.--"Scale Economies were equated with the exponent in the regression equation $v = kn^a$, where v is the 1963 ratio of value added in plants employing n persons to average value added (for the industry), and k is a constant." 4/

4/ Hufbauer, op. cit., pp. 221ff.

First Trade Dates. -- These "were found by examining successive issues (beginning in 1917) of the United States Census Bureau Schedule B (the detailed schedule of exportable goods) for the first appearance of specific commodities. The 3-digit SITC estimates represent a simple average of all seven digit commodities belonging to the 3-digit group."5/

5/ Ibid., p. 222.

Product Differentiation "is measured as the coefficient of variation in unit values of 1965 United States exports destined to different countries. Differentiated goods are marked by higher coefficients of variation." 6/

6/ Ibid.

Concentration ratio. -- As used here, "Concentration Ratio" refers to the percentage of domestic shipments accounted for by the four largest firms in the industry. Data for concentration by 4-digit SIC "industry" in 1963 were taken from the Census of Manufactures, 1963 (vol. I).

Industry growth. -- This measure, based on the TRC data, is the calculated percentage increase in total sales for each industry from 1958/60 to 1968.